

Pioneer

Service Manual

ORDER NO.
CRT2596

MULTI-CD/DAB CONTROL HIGH POWER CASSETTE PLAYER WITH FM/AM TUNER

KEH-P601 X1N/UC

KEH-P6010 X1N/UC

● This service manual should be used together with the following manual(s):

Model	Order No.	Mech. Module	Remarks
CX-1011	CRT2406	3L	Cassette Mech. Module: Mech.Description, Disassembly, Adjustment
KEH-P601/X1M/UC	CRT2598		

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

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K-ZZU. DEC. 2000 Printed in Japan

EXPLODED VIEWS AND PARTS LIST

PACKING (Page 2)

● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.	
			KEH-P601/X1M/UC	KEH-P601/X1N/UC
	13	Carton	CHG4206	CHG4260
	14	Contain Box	CHL4206	CHL4260
	15	Protector	CHP2243	CHP2251
	16	Protector	CHP2244	CHP2252

● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.	
			KEH-P6010/X1M/UC	KEH-P6010/X1N/UC
	13	Carton	CHG4205	CHG4259
	14	Contain Box	CHL4205	CHL4259
	15	Protector	CHP2243	CHP2251
	16	Protector	CHP2244	CHP2252

EXTERIOR (Page 4)

● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.	
			KEH-P601/X1M/UC	KEH-P601/X1N/UC
	9	Holder Unit	CXB6681	CNC8659(Holder)

● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.	
			KEH-P6010/X1M/UC	KEH-P6010/X1N/UC
	9	Holder Unit	CXB6681	CNC8659(Holder)

Service Manual

Pioneer

KEH-P601/X1M/UC



ORDER NO.
CRT2598

MULTI-CD CONTROL HIGH POWER CASSETTE PLAYER WITH FM/AM TUNER

KEH-P601

X1M/UC

KEH-P6010

X1M/UC

- This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-1011	CRT2406	3L	Cassette Mech. Module: Mech. Description, Disassembly, Adjustment

NOTE:

- This service manual does not describe the CD test mode.
For the operations in the CD test mode, refer to the CD player's Service manual.
- Extension cable of cassette mechanism : Jig No. GGD1121

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1. SAFETY INFORMATION

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

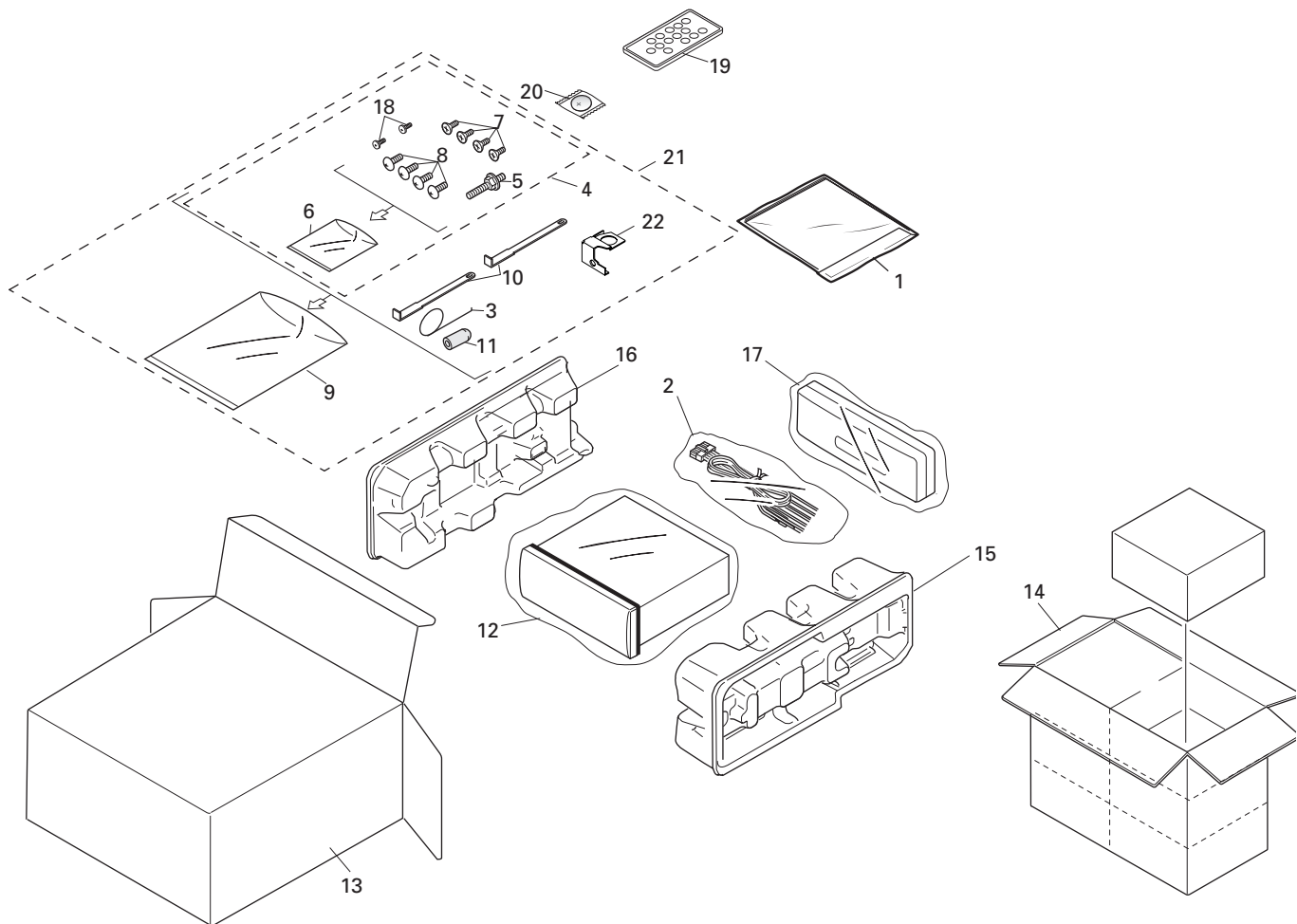
WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 - Proposition 65

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



NOTE:

- Parts marked by “*” are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.

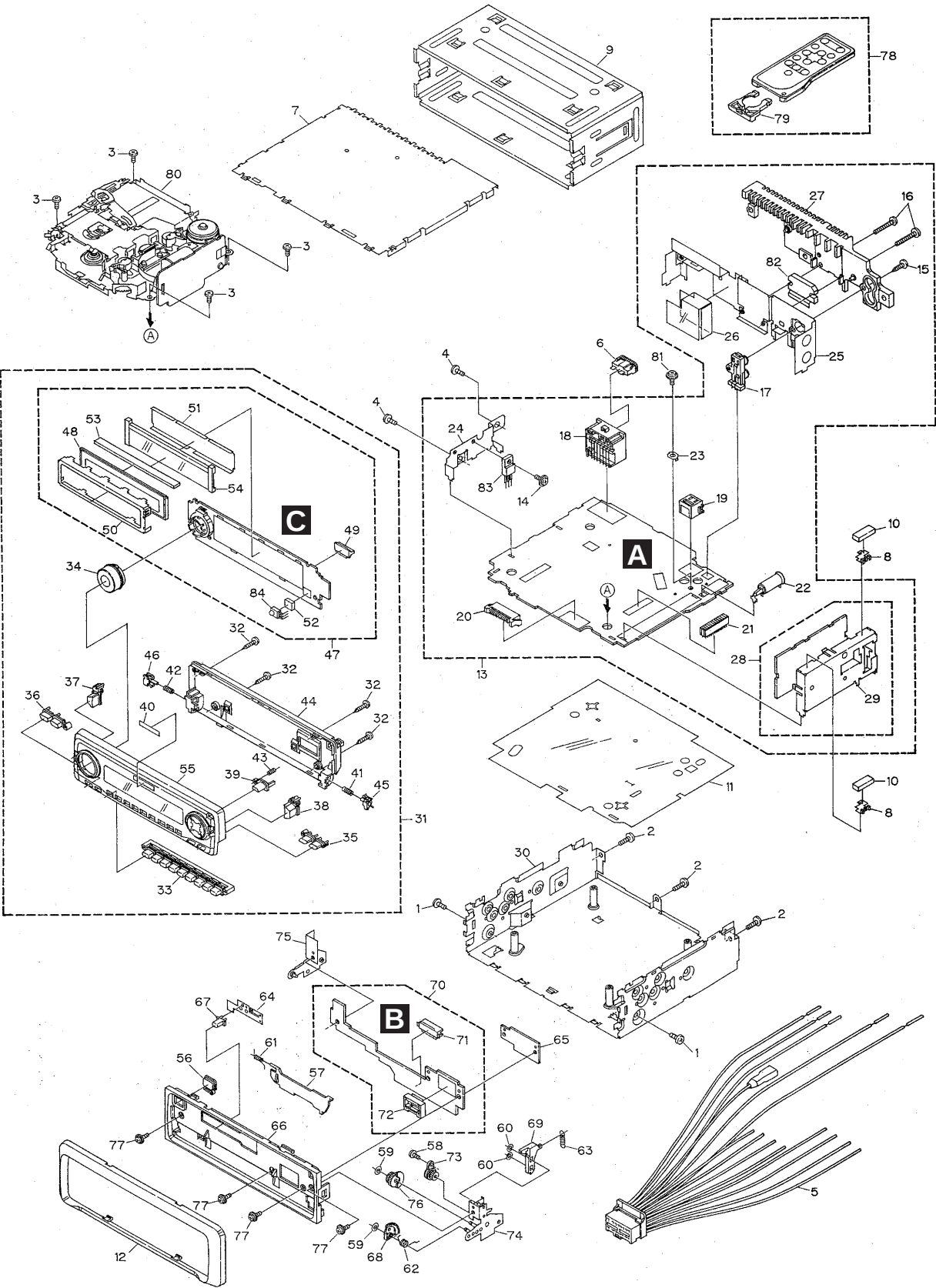
● PACKING SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1-1	Polyethylene Bag	CEG1116	10	Handle	CNC5395
1-2	Owner's Manual(P601)	CRD3342	11	Bush	CNV3930
	Owner's Manual(P6010)	CRD3341	12	Polyethylene Bag	CEG1173
1-3	Installation Manual(P601)	CRD3347	13	Carton(P601)	CHG4206
	Installation Manual(P6010)	CRD3346		Carton(P6010)	CHG4205
*	1-4 Warranty Card(P601)	CRY1070	14	Contain Box(P601)	CHL4206
*	1-5 Caution Card(P601)	CRP1242		Contain Box(P6010)	CHL4205
	2 Cord Assy	CDE6436	15	Protector	CHP2243
	3 Spring	CBH1650	16	Protector	CHP2244
	4 Screw Assy	CEA2796	17	Case Assy	CXB3520
	5 Screw	CBA1002	18	Screw	BPZ20P060FZK
*	6 Polyethylene Bag	CEG-127	19	Remote Control Unit	CXB6796
	7 Screw	CRZ50P090FMC	20	Battery	CEX1065
	8 Screw	TRZ50P080FMC	21	Accessory Assy	CEA2773
	9 Polyethylene Bag	CEG-158	22	Earth Plate	CNC9450

● Owner's Manual, Installation Manual

Model	Part No.	Language
KEH-P601/X1M/UC	CRD3342,CRD3341	English, French
KEH-P6010/X1M/UC	CRD3347,CRD3346	English, French

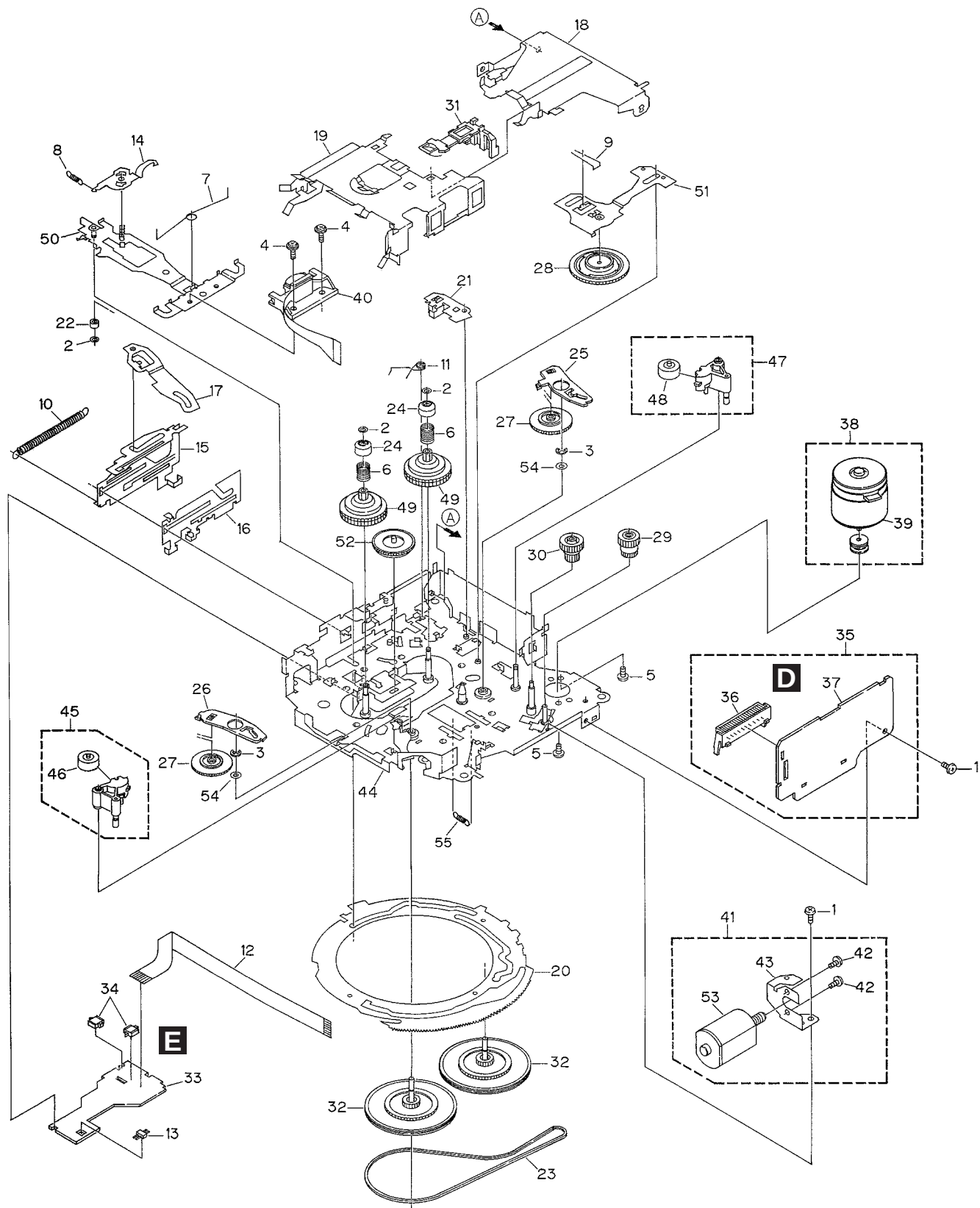
2.2 EXTERIOR



● EXTERIOR SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ30P040FZK	44	Cover	CNS6282
2	Screw	BMZ30P100FMC	45	Holder	CNV6505
3	Screw	BSZ26P050FMC	46	Holder	CNV6506
4	Screw	BSZ30P060FMC	47	Keyboard Unit	CWM7792
5	Cord Assy	CDE6436	48	LCD	CAW1628
6	Fuse(10A)	CEK1136	49	Connector(CN1901)	CKS4205
7	Case	CNB2686	50	Holder	CNC9053
8	Holder	CNC5704	51	Sheet	CNM6969
9	Holder Unit	CXB6681	52	Cushion	CNM6984
10	Cushion	CNM4870	53	Connector	CNV6440
11	Insulator	CNM6948	54	Lighting Conductor	CNV6441
12	Panel	CNS6332	55	Sub Grille Assy(P601)	CXB7168
13	Tuner Amp Unit(P601)	CWM7394		Sub Grille Assy(P6010)	CXB7169
	Tuner Amp Unit(P6010)	CWM7392	56	Button(EJECT)	CAC6839
14	Screw	ASZ26P060FMC	57	Door	CAT2109
15	Screw	BPZ26P120FMC	58	Screw(M2x2)	CBA1176
16	Screw	BSZ26P160FMC	59	Washer	CBF1038
17	Pin Jack(CN351)	CKB1035	60	Washer	CBF1039
18	Plug(CN901)	CKM1330	61	Spring	CBH1838
19	Connector(CN701)	CKS3408	62	Spring	CBH2428
20	Plug(CN750)	CKS3537	63	Spring	CBH2429
21	Connector(CN551)	CKS3568	64	Spring	CBL1512
22	Antenna Jack(CN402)	CKX1056	65	Holder	CNC9096
23	Holder(CN403)	CNC5399	66	Panel	CNS6280
24	Holder	CNC8615	67	Pin	CNV6486
25	Holder	CNC9472	68	Gear	CNV6507
26	Insulator	CNM6949	69	Arm	CNV6508
27	Heat Sink	CNR1583	70	Panel Unit	CWM7627
28	FM/AM Tuner Unit	CWE1563	71	Socket(CN1950)	CKS3550
29	Holder	CNC8815	72	Connector(CN1951)	CKS4206
30	Chassis Unit	CXB6106	73	Damper Unit	CXB5070
31	Detach Grille Assy(P601)	CXB6306	74	Holder Unit	CXB6356
	Detach Grille Assy(P6010)	CXB6304	75	Holder Unit	CXB6357
32	Screw	BPZ20P100FZK	76	Clutch Unit	CXB6358
33	Button(1-6)	CAC6773	77	Screw	IMS20P045FZK
34	Knob(Volume)	CAC6775	78	Remote Control Unit	CXB6796
35	Button(FUNC/AUDIO)	CAC6776	79	Cover	CNS6439
36	Button(SOURCE/DISP)	CAC6777	80	Cassette Mechanism Module	EXK4050
37	Button(EQ)	CAC6778	81	Screw	ISS26P055FUC
38	Button(SFEQ)	CAC6779	82	IC(IC361)	PAL006A
39	Button(OPEN)	CAC6780	83	Transistor(Q910)	2SD2396
* 40	Badge	CAH1755	84	IC(IC1902)	SBX8035-H
41	Spring	CBH2430			
42	Spring	CBH2431			
43	Spring	CBH2491			

2.3 CASSETTE MECHANISM MODULE



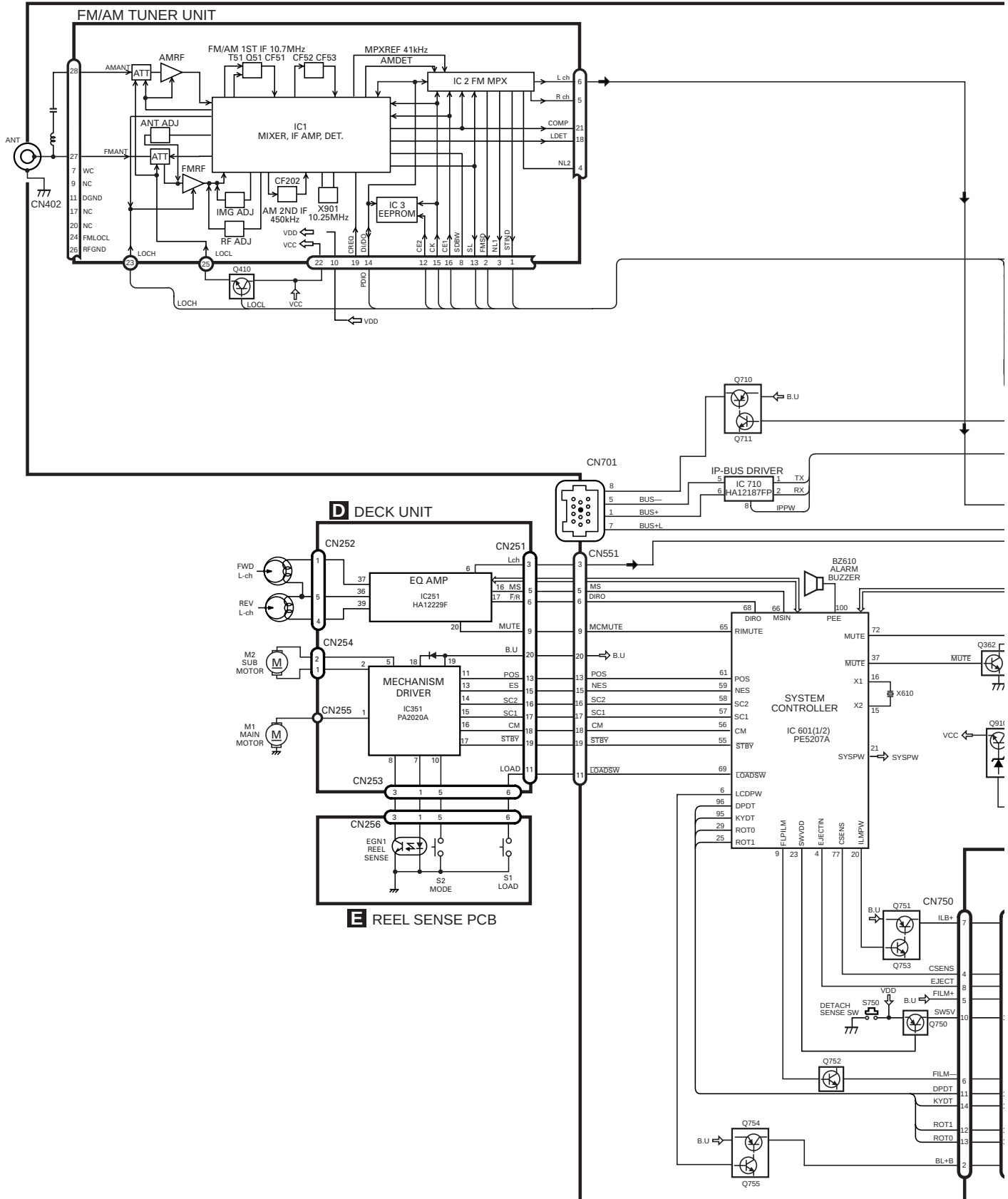
● CASSETTE MECHANISM MODULE SECTION PARTS LIST

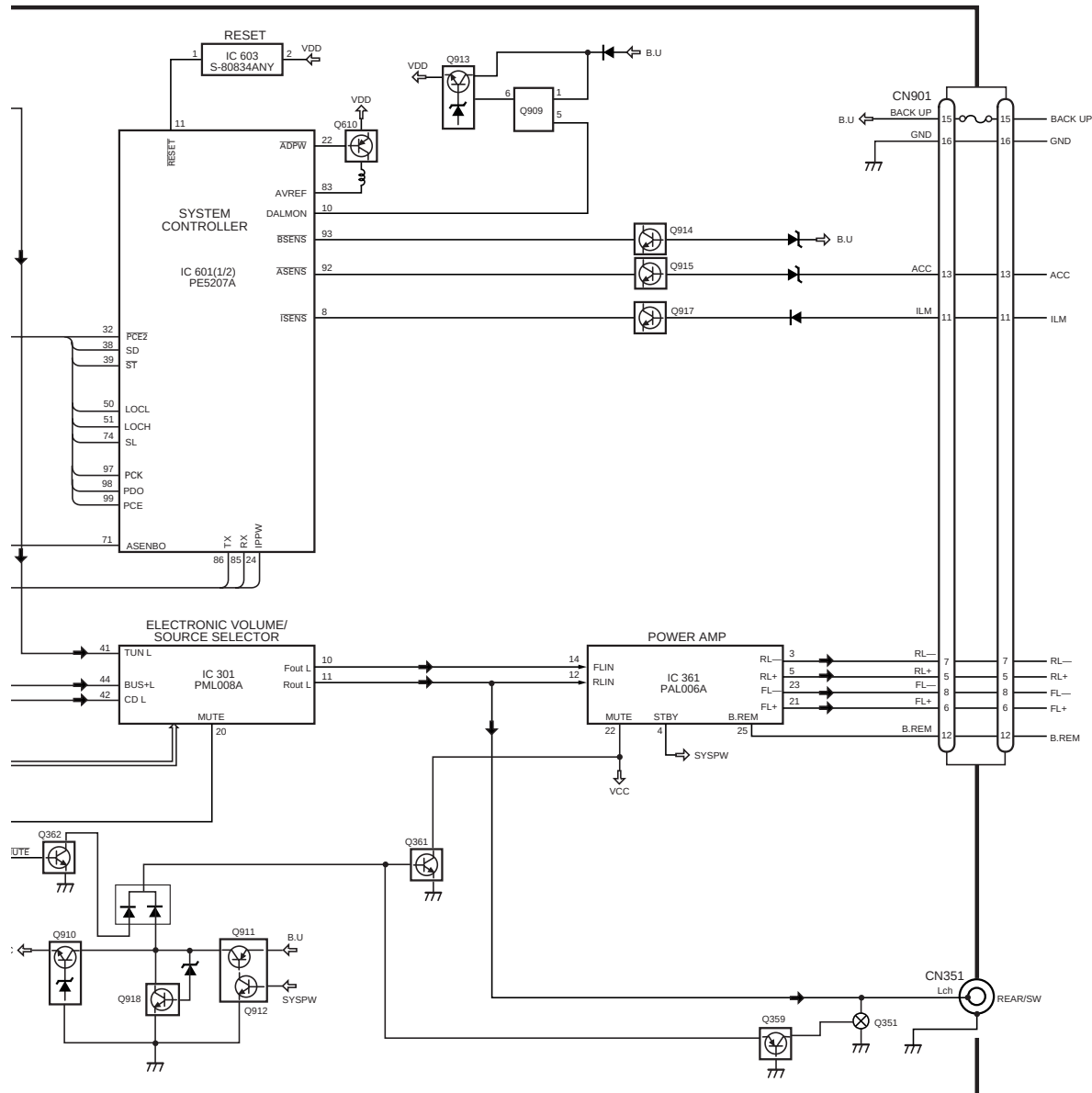
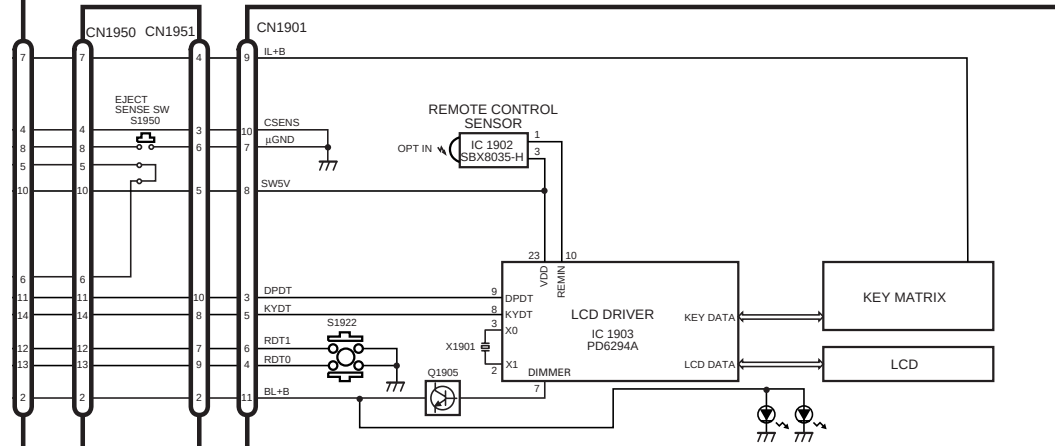
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BSZ20P040FMC	46	Pinch Roller	ENV1518
2	Washer	CBF1037	47	Pinch Holder Unit	EXA1607
3	Washer	CBG1003	48	Pinch Roller	ENV1518
4	Screw	EBA1028	49	Reel Unit	EXA1585
5	Screw	CBA1037	50	Head Base Unit	EXA1611
6	Spring	EBH1531	51	Lever Unit	EXA1587
7	Spring	EBH1642	52	Gear Unit	EXA1596
8	Spring	EBH1641	53	Motor Unit(Service)	EXX1055
9	Spring	EBH1626	54	Washer	HBF-179
10	Spring	EBH1627	55	Spring	EBH1537
11	Spring	EBH1649			
12	Cord	EDD1024			
13	Photo-reflector(EGN1)	EGN1004			
14	Arm	ENC1526			
15	Lever	ENC1544			
16	Lever	ENC1543			
17	Arm	ENC1532			
18	Frame	ENC1533			
19	Holder	ENC1534			
20	Gear	ENC1535			
21	Arm	ENC1550			
22	Roller	ENR1040			
23	Belt	ENT1027			
24	Collar	ENV1508			
25	Arm	ENV1539			
26	Arm	ENV1540			
27	Gear	ENV1544			
28	Gear	ENV1547			
29	Gear	ENV1560			
30	Worm Wheel	ENV1566			
31	Lever	ENV1551			
32	Flywheel	ENV1554			
33	Gathering PCB	ENX1068			
34	Switch(S1,S2)	ESG1007			
* 35	Deck Unit	EWM1032			
36	Plug(CN251)	CKS3540			
37	Gathering PCB	ENX1067			
38	Motor Unit(M1)	EXA1491			
39	Motor	EXM1028			
40	Head Assy(HD1)	EXA1592			
41	Motor Unit(M2)	EXA1580			
42	Screw	BMZ20P022FMC			
43	Bracket	ENC1528			
44	Chassis Unit	EXA1615			
45	Pinch Holder Unit	EXA1608			

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

A TUNER AMP UNIT

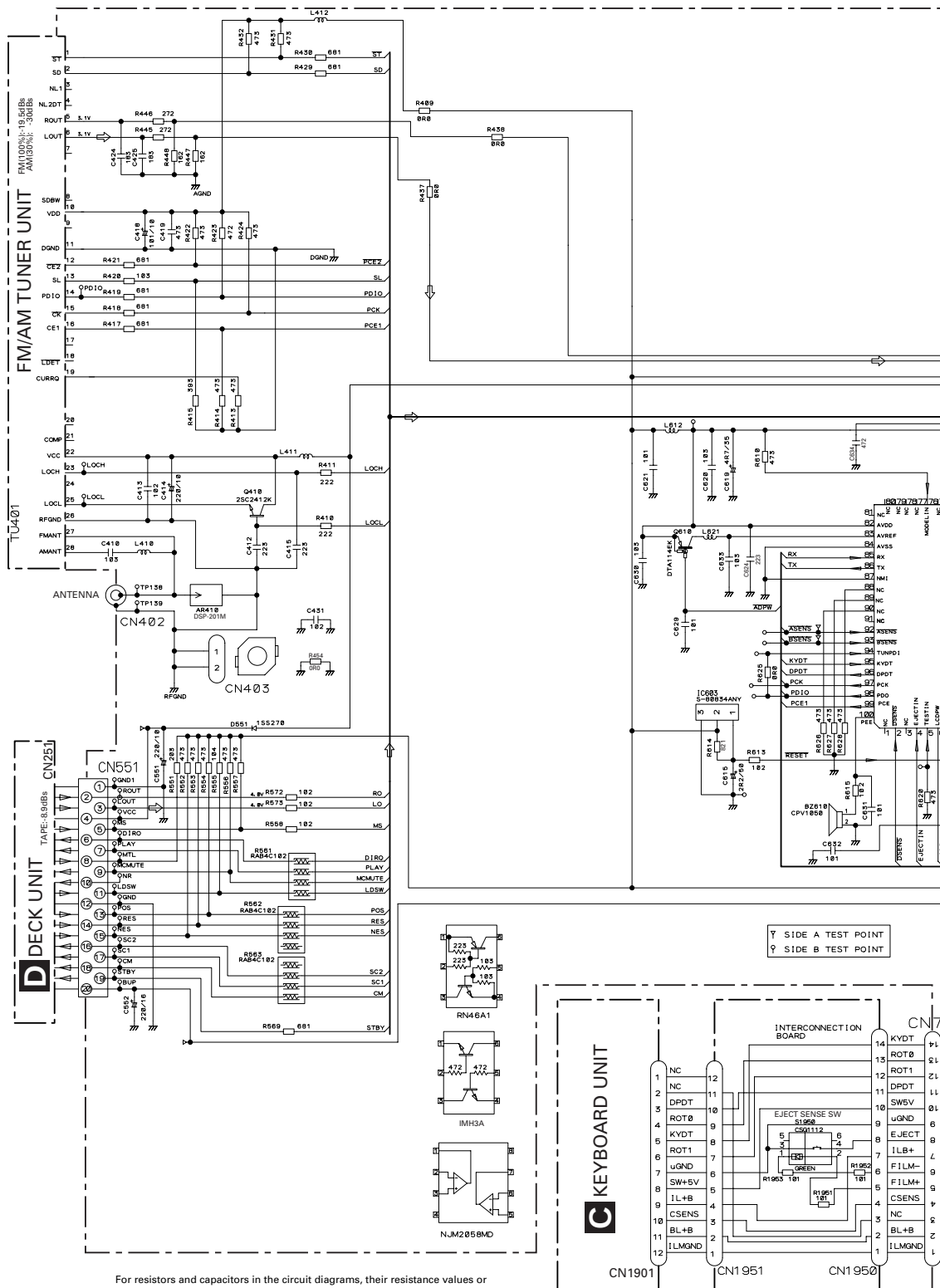
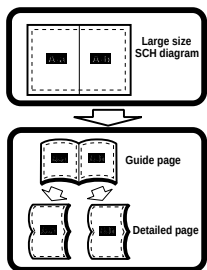


**B PANEL UNIT****C KEYBOARD UNIT**

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

A-a



For resistors and capacitors in the circuit diagrams, their resistance values or capacitance values are expressed in codes:

Ex. *Resistors

Code	Practical value
123	12k ohms
103	10k ohms

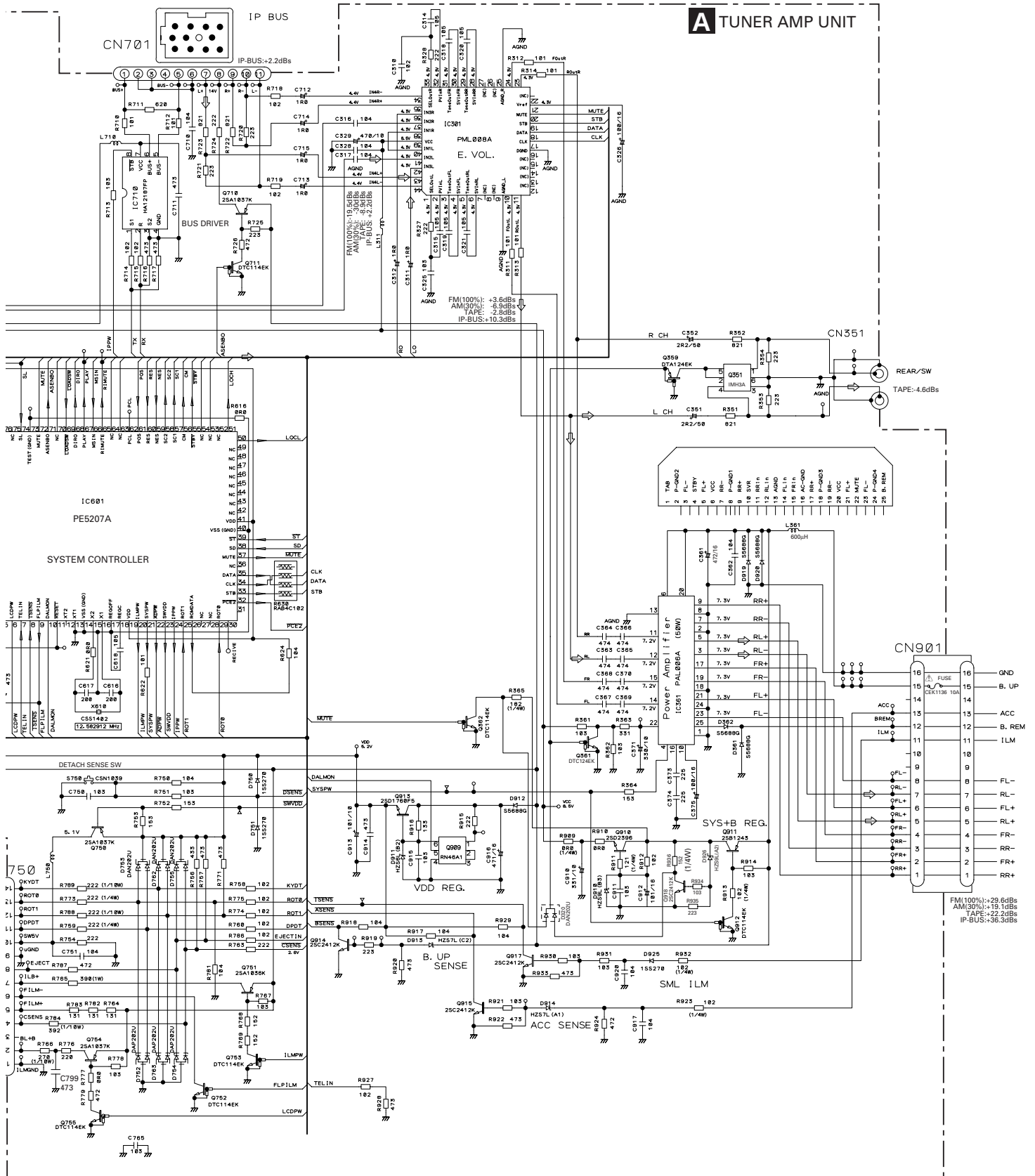
*Capacitors

Code	Practical value
103	0.01uF
101/10	100uF/10V

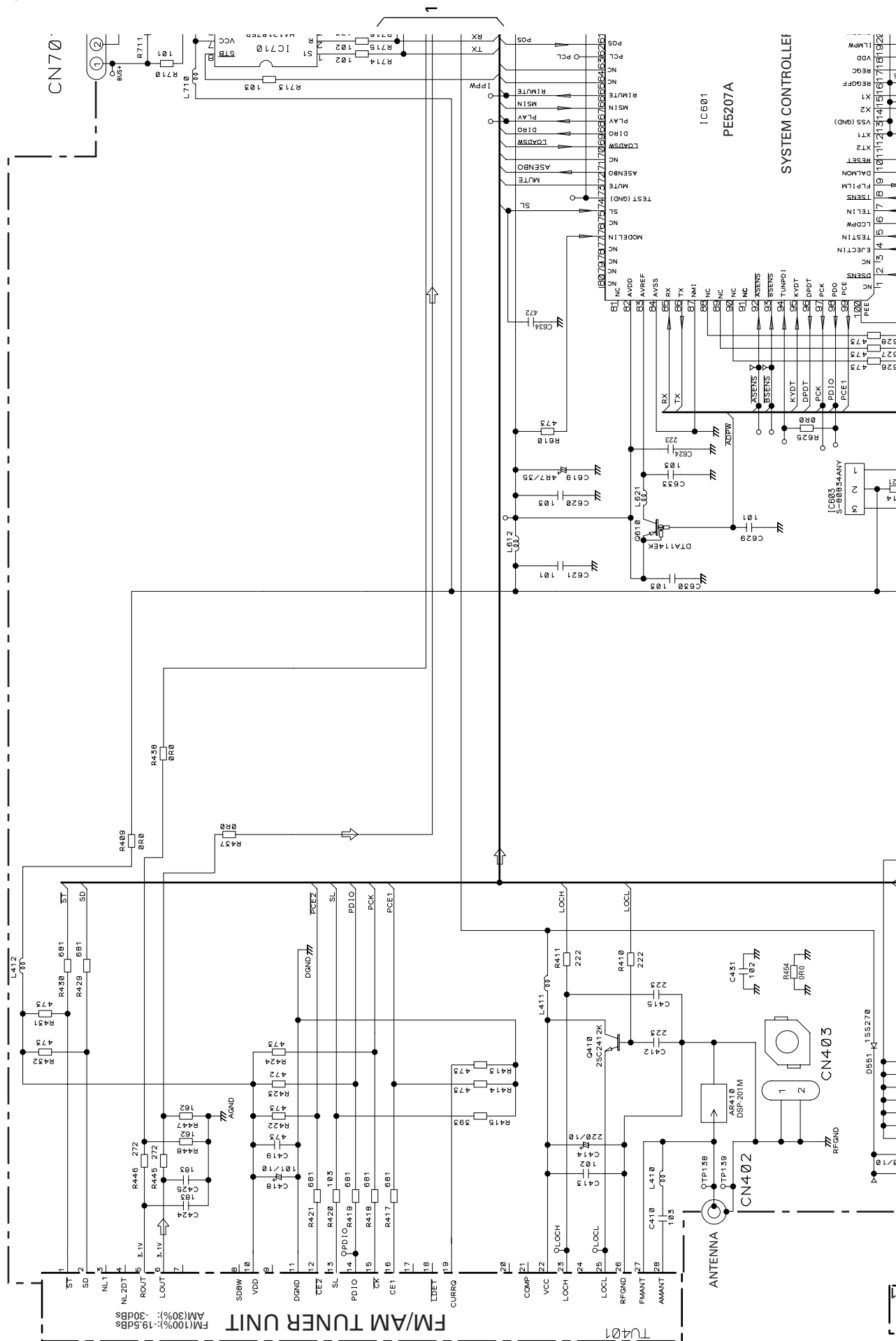
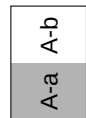
The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

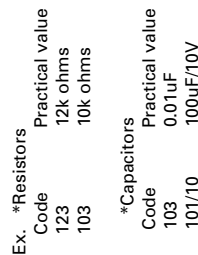
A-b

A TUNER AMP UNIT



A





The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

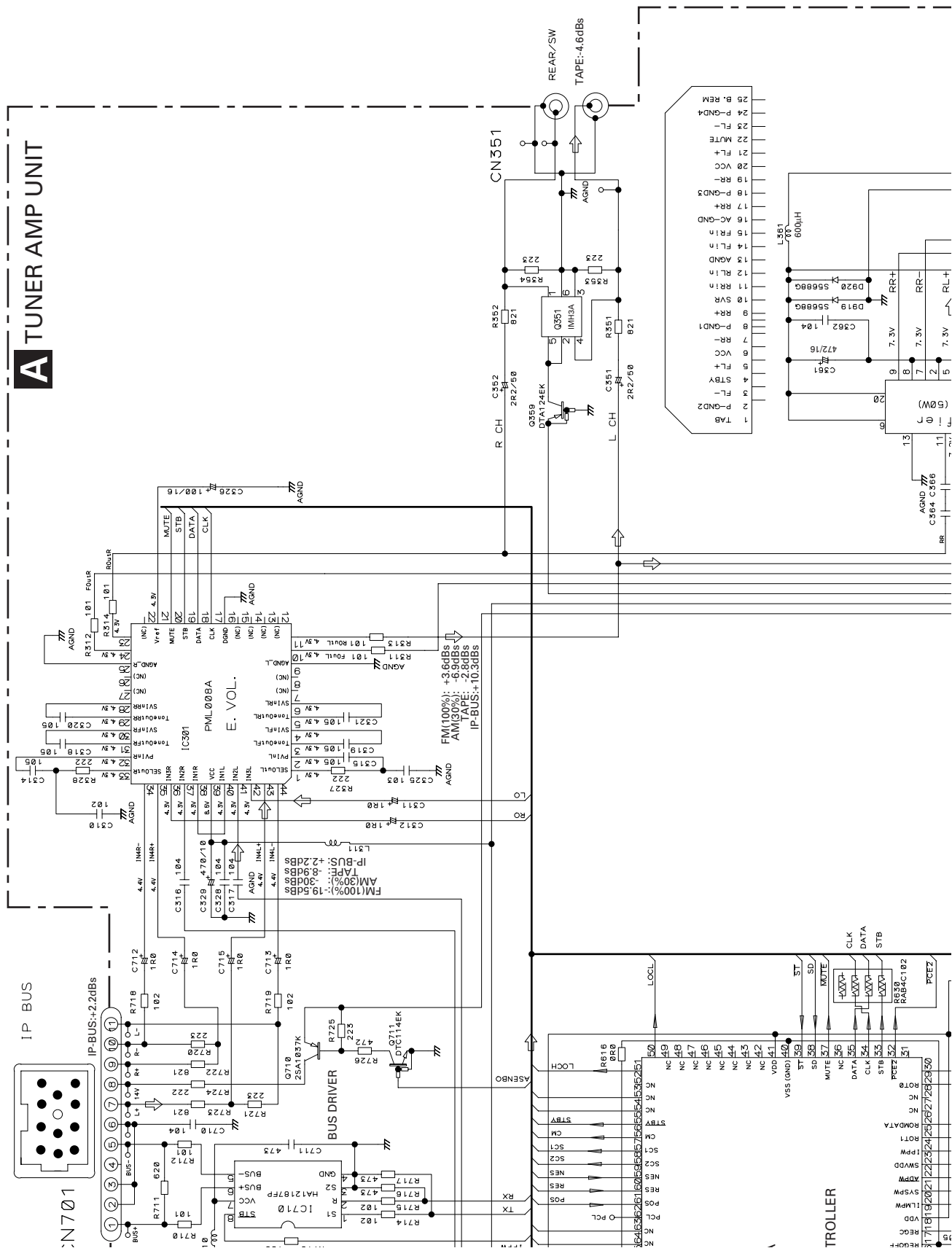
A-a A-b

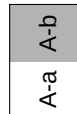
A

B

C

D





D

3.3 KEYBOARD UNIT

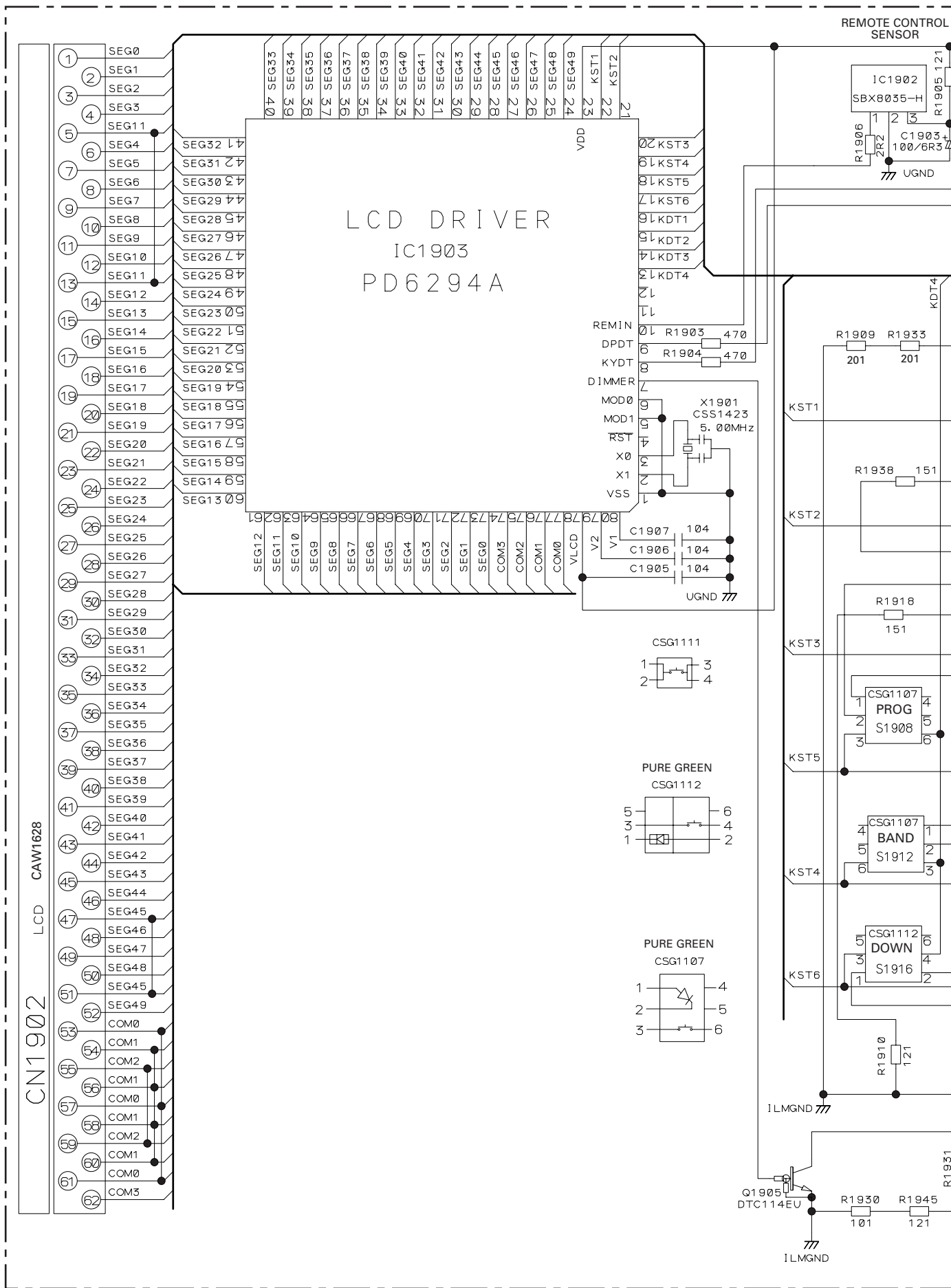
A

B

C

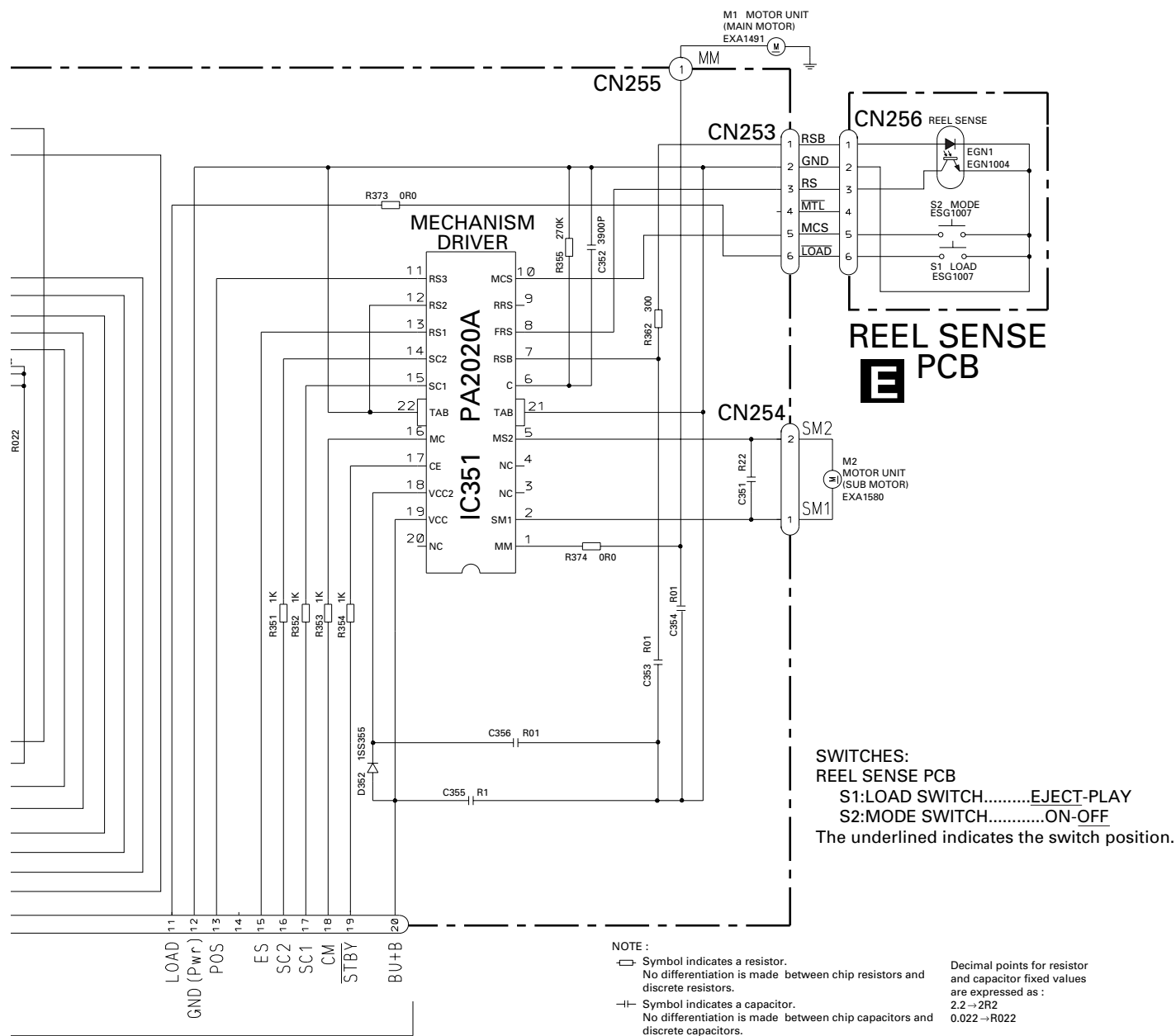
D

C



18



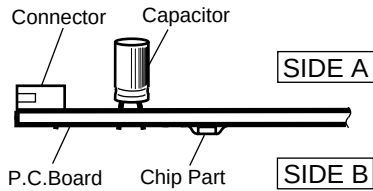


4. PCB CONNECTION DIAGRAM

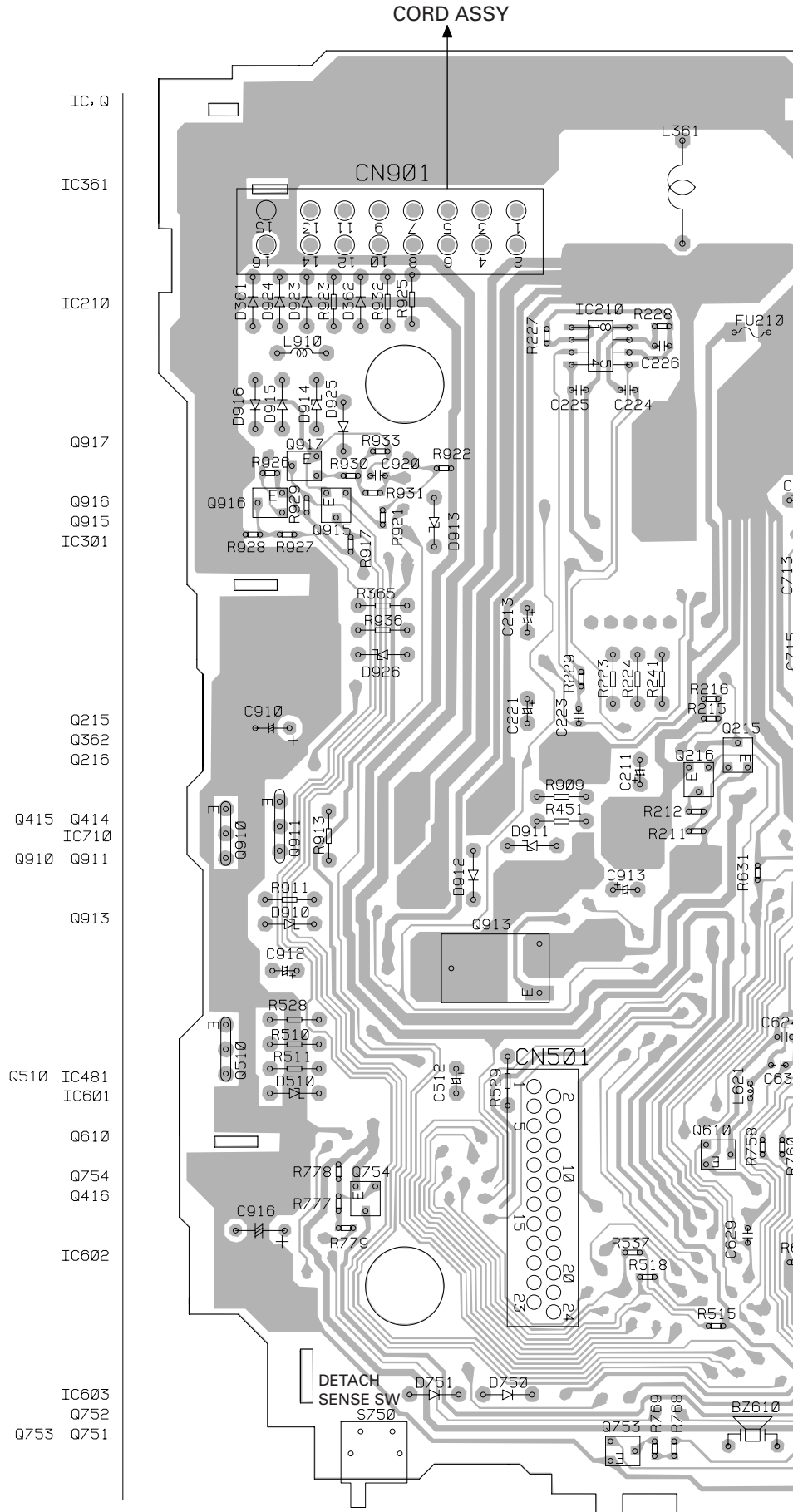
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
- For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams

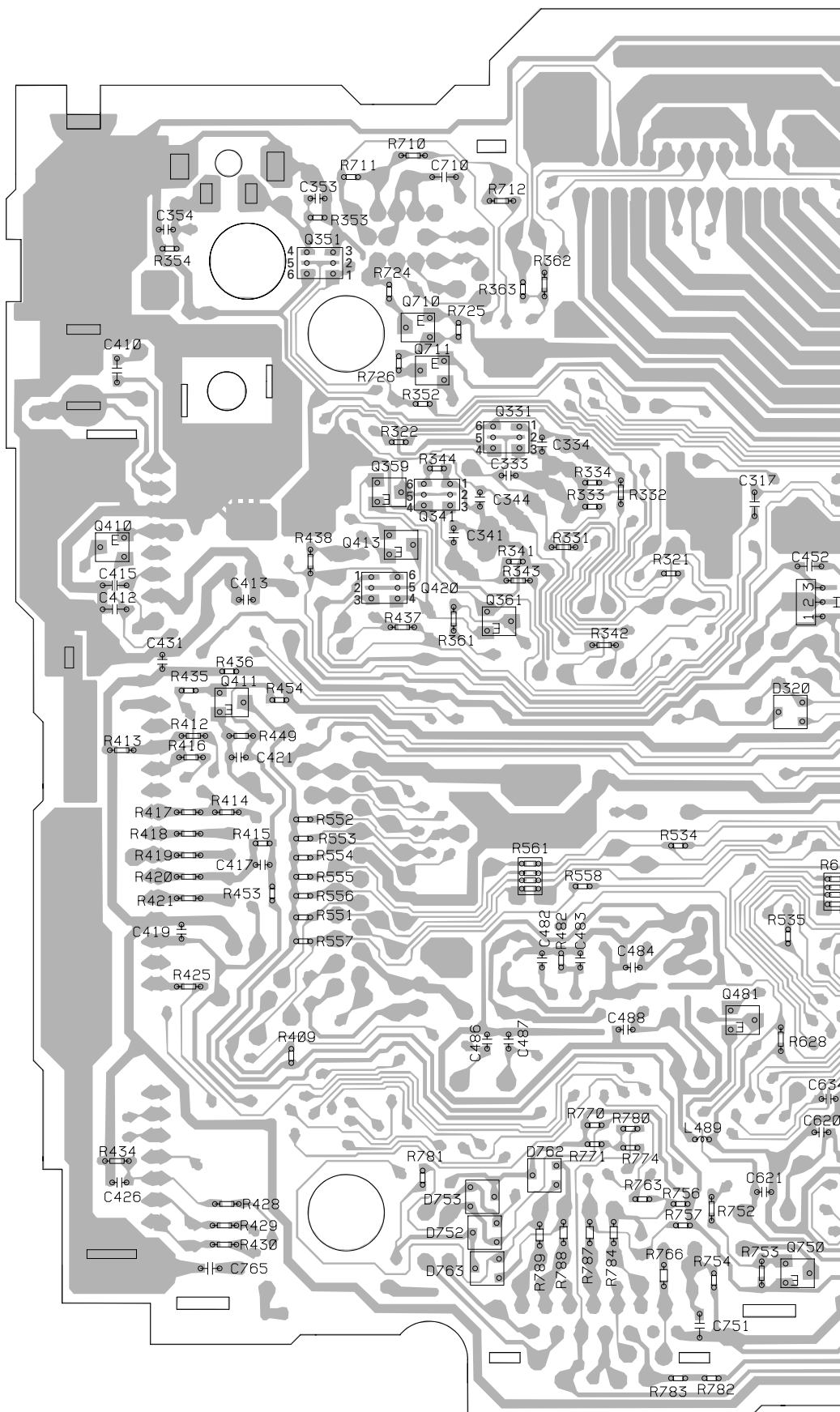


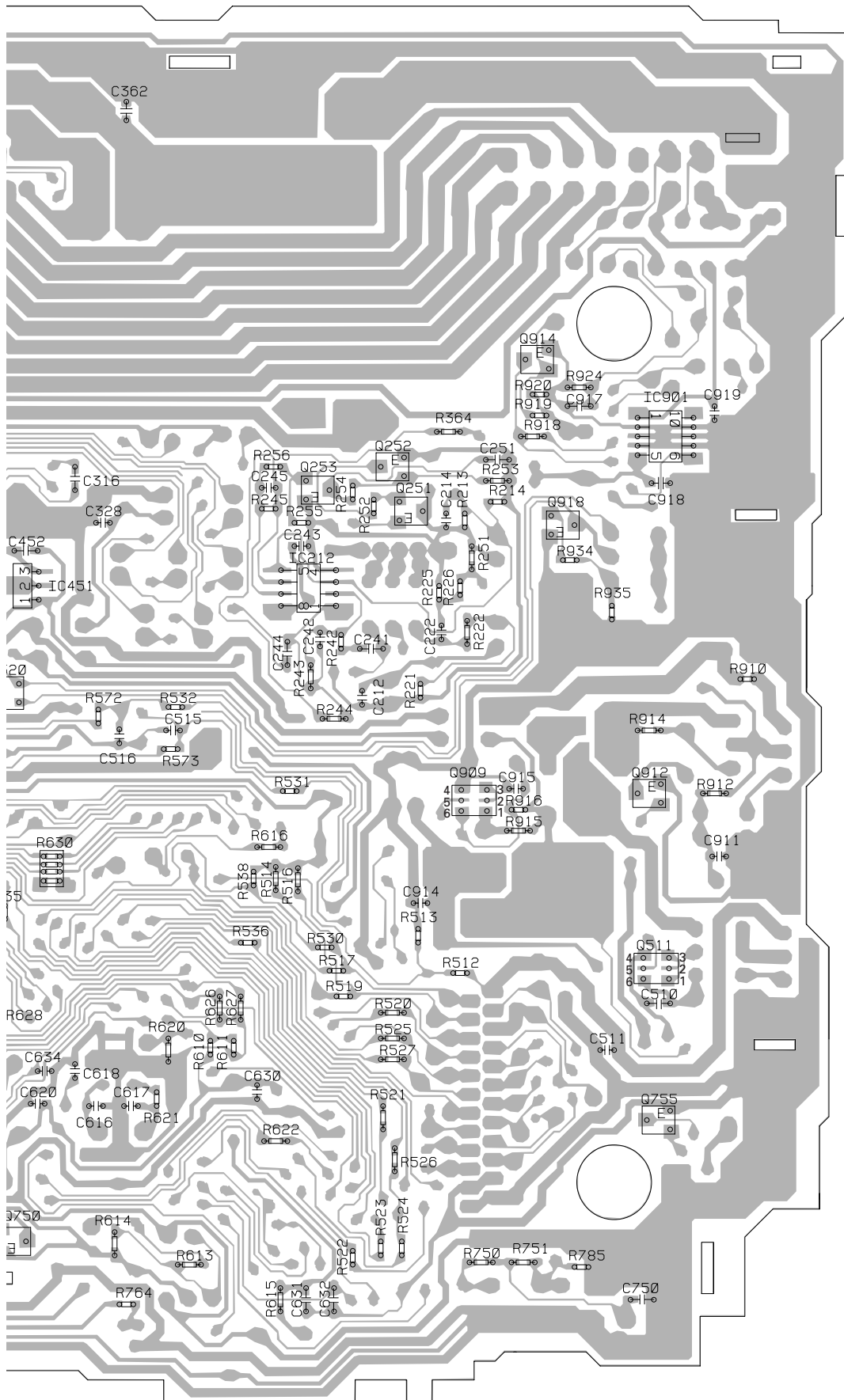
A TUNER AMP UNIT





A TUNER AMP UNIT





IC, Q

SIDE B

Q351

Q710

Q711 Q914

Q331 IC901

Q252 Q359 Q253

Q341 Q251

Q410 Q918

Q413 IC212

Q420 Q361 IC451

Q411

Q909 Q912

Q511

Q481

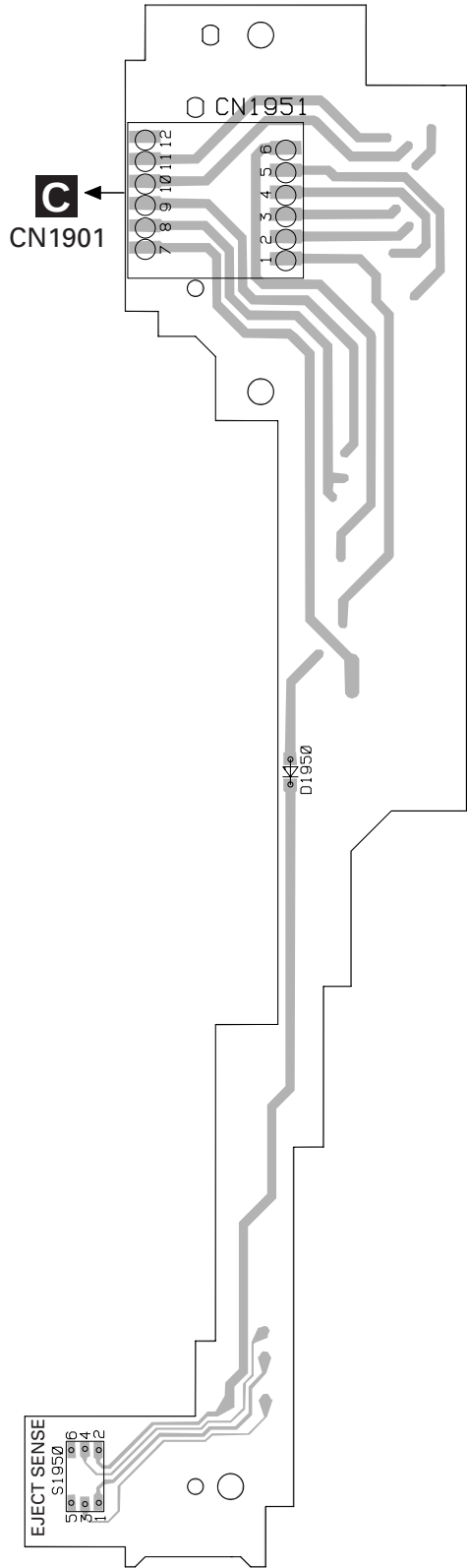
Q755

Q750

4.2 PANEL UNIT

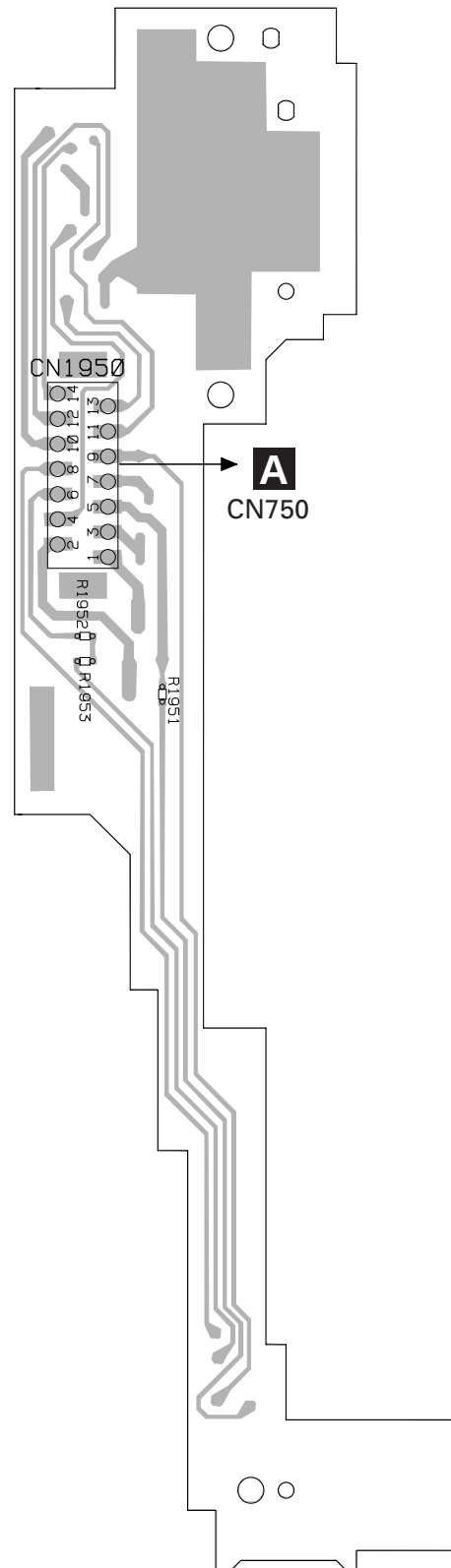
B PANEL UNIT

SIDE A



B PANEL UNIT

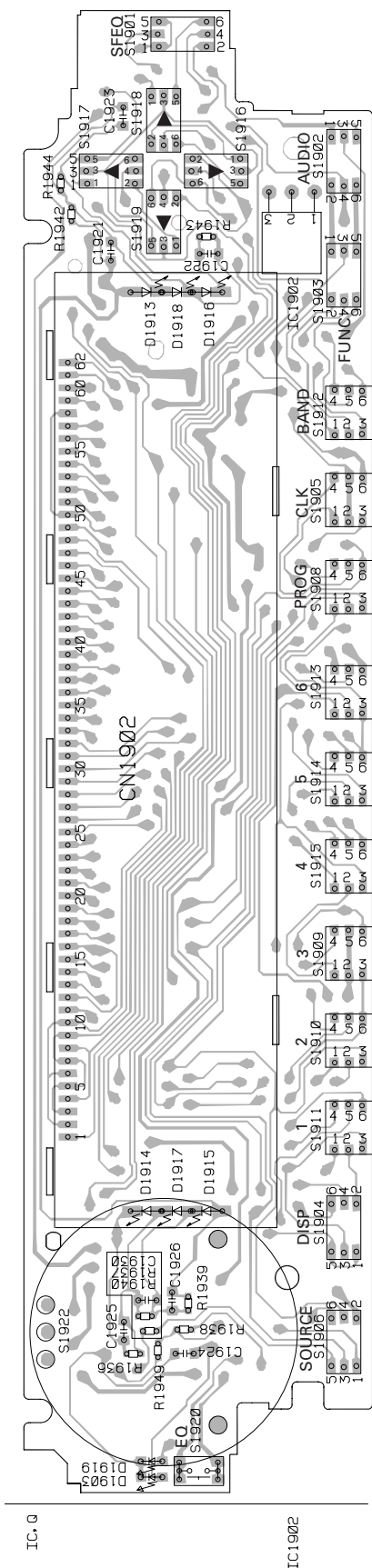
SIDE B



4.3 KEYBOARD UNIT

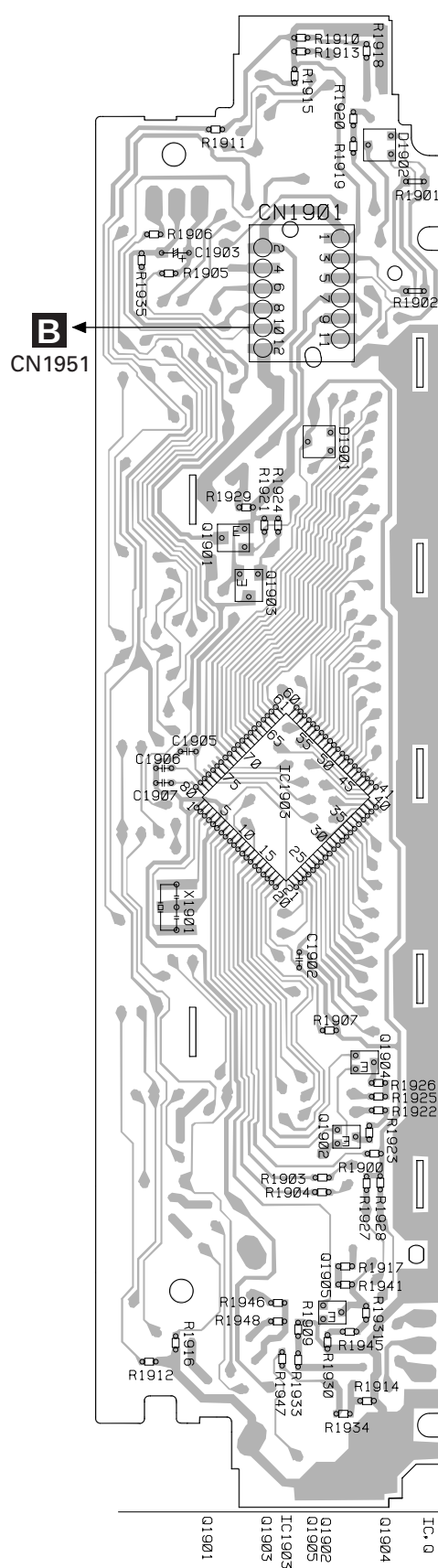
C KEYBOARD UNIT

SIDE A



C KEYBOARD UNIT

SIDE B



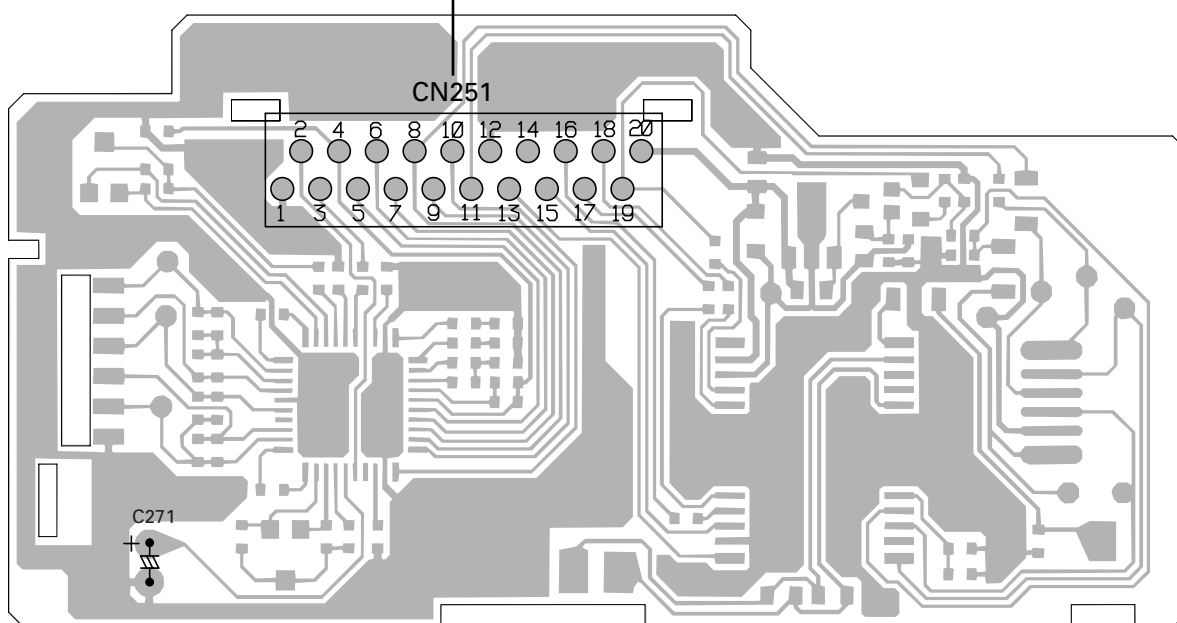
C

4.4 CASSETTE MECHANISM MODULE

D DECK UNIT

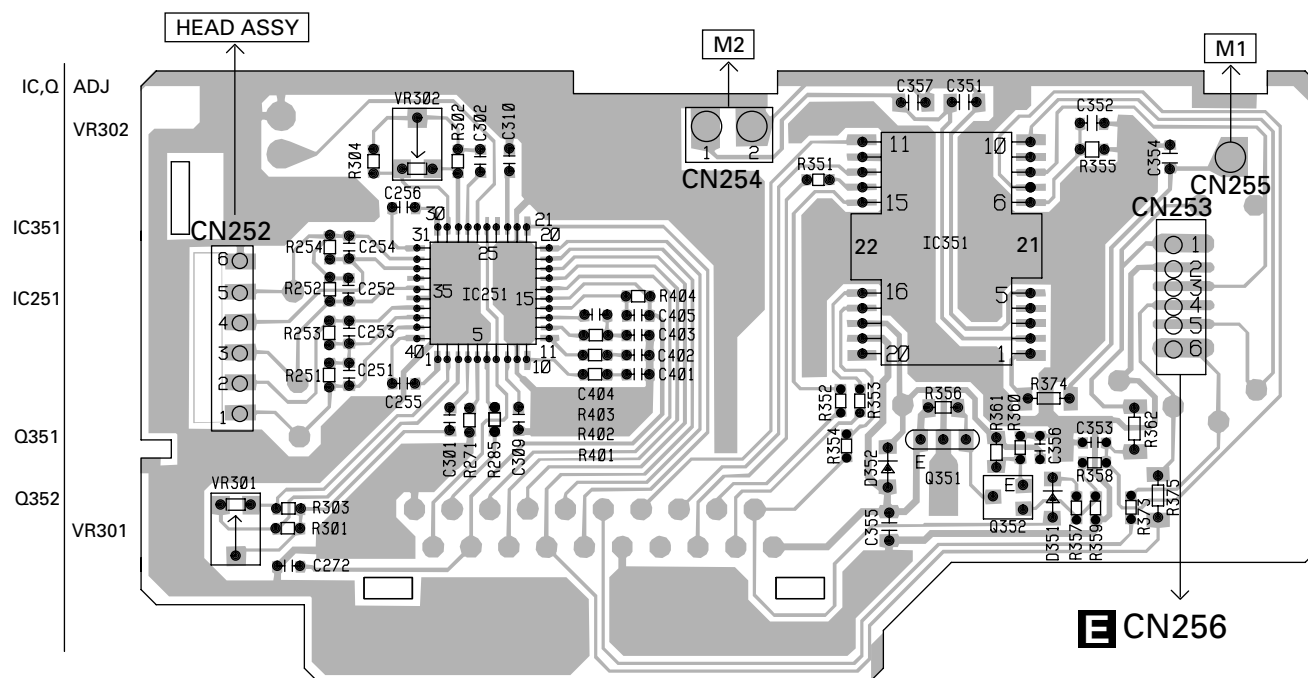
A CN551

SIDE A



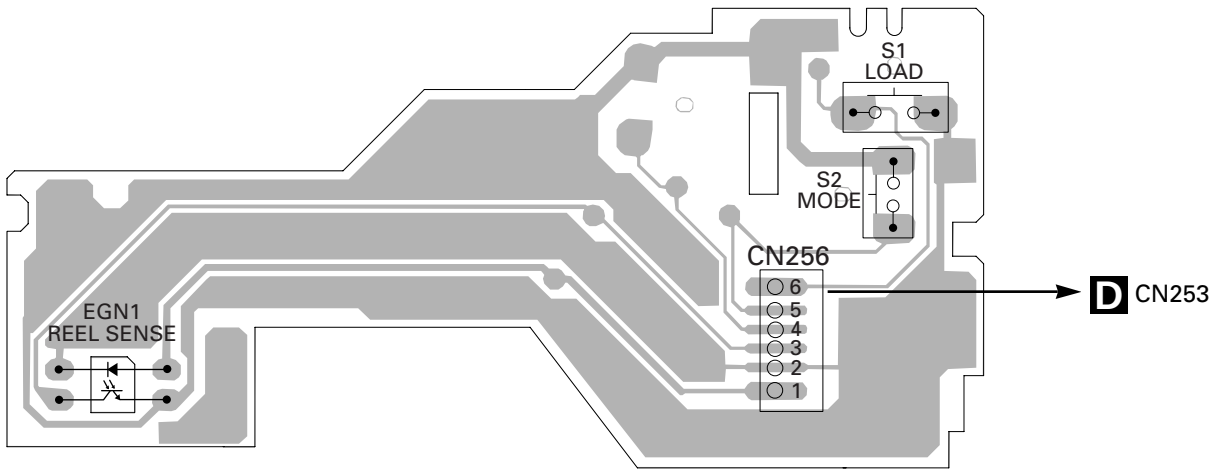
D DECK UNIT

SIDE B



E CN256

E REEL SENSE PCB



5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

====Circuit Symbol and No.==Part Name			Part No.	====Circuit Symbol and No.==Part Name			Part No.
A	Unit Number : CWM7394(KEH-P601/X1M/UC)			L	361	Choke Coil 600μH	CTH1221
	Unit Number : CWM7392(KEH-P6010/X1M/UC)			L	410	Ferri-Inductor	LAU4R7K
	Unit Name : Tuner Amp Unit			L	411	Ferri-Inductor	LAU2R2K
				L	412	Ferri-Inductor	LAU2R2K
				L	612	Inductor	LAU100K
MISCELLANEOUS				L	621	Inductor	CTF1346
IC	301	IC	PML008A	L	710	Ferri-Inductor	LAU2R2K
IC	361	IC	PAL006A	L	750	Ferri-Inductor	LAU2R2K
IC	601	IC	PE5207A	X	610	Radiator 12.58291MHz	CSS1402
IC	603	IC	S-80834ANY	S	750	Switch	CSN1039
IC	710	IC	HA12187FP				
Q	351	Transistor	IMH3A	BZ	610	Buzzer	CPV1050
Q	359	Transistor	DTA124EK	AR	410	Arrester	DSP-201M
Q	361	Transistor	DTC124EK			FM/AM Tuner Unit	CWE1563
Q	362	Transistor	DTC114EK	RESISTORS			
Q	410	Transistor	2SC2412K	R	311		RS1/16S101J
Q	610	Transistor	DTA114EK	R	312		RS1/16S101J
Q	710	Transistor	2SA1037K	R	313		RS1/16S101J
Q	711	Transistor	DTC114EK	R	314		RS1/16S101J
Q	750	Transistor	2SA1037K	R	327		RS1/16S222J
Q	751	Transistor	2SA1036K				
Q	752	Transistor	DTC114EK	R	328		RS1/16S222J
Q	753	Transistor	DTC114EK	R	351		RS1/16S821J
Q	754	Transistor	2SA1037K	R	352		RS1/16S821J
Q	755	Transistor	DTC114EK	R	353		RS1/16S223J
Q	909	Transistor	RN46A1	R	354		RS1/16S223J
Q	910	Transistor	2SD2396	R	361		RS1/16S103J
Q	911	Transistor	2SB1243	R	362		RS1/16S103J
Q	912	Transistor	DTC114EK	R	363		RS1/16S331J
Q	913	Transistor	2SD1760F5	R	364		RS1/16S153J
Q	914	Transistor	2SC2412K	R	365		RD1/4PU182J
Q	915	Transistor	2SC2412K	R	409		RS1/16S0R0J
Q	917	Transistor	2SC2412K	R	410		RS1/16S222J
Q	918	Transistor	2SC2412K	R	411		RS1/16S222J
D	320	Diode	DAN202U	R	413		RS1/16S473J
D	361	Diode	S5688G	R	414		RS1/16S473J
D	362	Diode	S5688G	R	415		RS1/16S393J
D	551	Diode	1SS270	R	417		RS1/16S681J
D	750	Diode	1SS270	R	418		RS1/16S681J
D	751	Diode	1SS270	R	419		RS1/16S681J
D	752	Diode	DAP202U	R	420		RS1/16S103J
D	753	Diode	DAN202U	R	421		RS1/16S681J
D	754	Diode	DAP202U	R	422		RS1/16S473J
D	755	Diode	DAN202U	R	423		RS1/16S472J
D	762	Diode	DAN202U	R	424		RS1/16S473J
D	763	Diode	DAP202U	R	429		RS1/16S681J
D	910	Diode	HZS9L(B3)	R	430		RS1/16S681J
D	911	Diode	HZS6L(B2)	R	431		RS1/16S473J
D	912	Diode	S5688G	R	432		RS1/16S473J
D	913	Diode	HZS7L(C2)	R	437		RS1/16S0R0J
D	914	Diode	HZS7L(A1)	R	438		RS1/16S0R0J
D	919	Diode	S5688G	R	445		RS1/16S272J
D	920	Diode	S5688G	R	446		RS1/16S272J
D	925	Diode	1SS270	R	447		RS1/16S162J
D	926	Diode	HZS9L(A2)	R	448		RS1/16S162J
L	311	Ferri-Inductor	LAU4R7K	R	454		RS1/16S0R0J
				R	551		RS1/16S203J

====Circuit Symbol and No.==Part Name	Part No.	====Circuit Symbol and No.==Part Name	Part No.
R 552	RS1/16S473J	R 781	RS1/16S104J
R 553	RS1/16S473J	R 782	RS1/16S131J
R 554	RS1/16S473J	R 783	RS1/16S131J
R 555	RS1/16S104J	R 784	RS1/10S392J
		R 786	RS1/16S102J
R 556	RS1/16S473J		
R 557	RS1/16S473J	R 787	RS1/10S472J
R 558	RS1/16S102J	R 788	RS1/10S222J
R 561	RAB4C102J	R 789	RS1/10S222J
R 562	RAB4C102J	R 909	RD1/4PU0R0J
		R 910	RS1/16S0R0J
R 563	RAB4C102J		
R 569	RS1/16S681J	R 911	RD1/4PU121J
R 572	RS1/16S102J	R 912	RS1/16S102J
R 573	RS1/16S102J	R 913	RD1/4PU102J
R 610	RS1/16S473J	R 914	RS1/16S103J
		R 915	RS1/16S222J
R 613	RS1/16S102J		
R 614	RS1/16S821J	R 916	RS1/16S133J
R 615	RS1/16S102J	R 917	RS1/16S104J
R 616	RS1/16S0R0J	R 918	RS1/16S104J
R 620	RS1/16S473J	R 919	RS1/16S223J
		R 920	RS1/16S473J
R 621	RS1/16S0R0J		
R 622	RS1/16S101J	R 921	RS1/16S103J
R 624	RS1/16S104J	R 922	RS1/16S473J
R 625	RS1/16S0R0J	R 923	RD1/4PU102J
R 626	RS1/16S473J	R 924	RS1/16S472J
		R 927	RS1/16S102J
R 627	RS1/16S473J		
R 628	RS1/16S473J	R 928	RS1/16S473J
R 630	RAB4C102J	R 929	RS1/16S104J
R 710	RS1/16S101J	R 930	RS1/16S103J
R 711	RS1/16S620J	R 931	RS1/16S103J
		R 932	RD1/4PU102J
R 712	RS1/16S101J		
R 713	RS1/16S103J	R 933	RS1/16S473J
R 714	RS1/16S102J	R 934	RS1/16S103J
R 715	RS1/16S102J	R 935	RS1/16S223J
R 716	RS1/16S473J	R 936	RD1/4PU152J
R 717	RS1/16S473J	CAPACITORS	
R 718	RS1/16S102J	C 310	CKSRYB102K50
R 719	RS1/16S102J	C 311	CEJA1R0M50
R 720	RS1/16S223J	C 312	CEJA1R0M50
R 721	RS1/16S223J	C 314	CKSRYB105K6R3
		C 315	CKSRYB105K6R3
R 722	RS1/16S821J		
R 723	RS1/16S821J		
R 724	RS1/16S222J	C 316	CKSRYB104K16
R 725	RS1/16S223J	C 317	CKSRYB104K16
R 726	RS1/16S472J	C 318	CKSRYB105K6R3
		C 319	CKSRYB105K6R3
R 750	RS1/16S104J	C 320	CKSRYB105K6R3
R 751	RS1/16S103J		
R 752	RS1/16S153J	C 321	CKSRYB105K6R3
R 753	RS1/16S153J	C 325	CKSRYB102K50
R 754	RS1/16S222J	C 326	CEJA100M16
		C 328	CKSRYB104K16
R 756	RS1/16S433J	C 329	CEJA470M10
R 757	RS1/16S473J		
R 758	RS1/16S102J	C 351	CEJA2R2M50
R 759	RD1/4PU222J	C 352	CEJA2R2M50
R 760	RS1/16S102J	C 361	CCH1367
		C 362	CKSQYB104K16
R 763	RS1/16S222J	C 363	CKSQYB474K16
R 764	RS1/16S131J		
R 765	RS1PMF390J	C 364	CKSQYB474K16
R 766	RS1/10S270J	C 365	CKSQYB474K16
R 767	RS1/16S103J	C 366	CKSQYB474K16
		C 367	CKSQYB474K16
R 768	RS1/16S152J	C 368	CKSQYB474K16
R 769	RS1/16S152J		
R 771	RS1/16S473J	C 369	CKSQYB474K16
R 773	RD1/4PU222J	C 370	CKSQYB474K16
R 774	RS1/16S102J	C 371	CEJA330M10
		C 373	CKSQYB225K10
R 775	RS1/16S102J	C 374	CKSQYB225K10
R 776	RS1/16S220J		
R 777	RS1/16S0R0J		
R 778	RS1/16S103J		
R 779	RS1/16S472J		

4700μF/16V

====Circuit Symbol and No.==Part Name		Part No.	====Circuit Symbol and No.==Part Name		Part No.
C	375	CEJA100M16	S	1913	Switch
C	410	CKSQYB103K50	S	1914	Switch
C	412	CKSRYB223K25	S	1915	Switch
C	413	CKSRYB102K50	S	1916	Push Switch
C	414	CEJA220M10	S	1917	Push Switch
C	415	CKSRYB223K25	S	1918	Push Switch
C	418	CEAL101M10	S	1919	Push Switch
C	419	CKSRYB473K16	S	1920	Push Switch
C	424	CKSRYB183K25	S	1922	Switch
C	425	CKSRYB183K25			LCD
C	431	CKSRYB102K50	RESISTORS		
C	551	CEJA220M10	R	1901	RS1/10S222J
C	552	CEJA220M16	R	1902	RS1/10S222J
C	615	CEAL2R2M50	R	1903	RS1/16S470J
C	616	CCSRCH200J50	R	1904	RS1/16S470J
C	617	CCSRCH200J50	R	1905	RS1/16S121J
C	618	CKSRYB105K6R3			
C	619	CEAL4R7M35	R	1906	RS1/16S2R2J
C	620	CKSRYB103K50	R	1909	RS1/16S201J
C	621	CCSRCH101J50	R	1910	RS1/16S121J
			R	1911	RS1/16S121J
			R	1912	RS1/16S121J
C	624	CKSRYB223K25	R	1913	RS1/16S121J
C	629	CCSRCH101J50	R	1914	RS1/16S121J
C	630	CKSRYB103K50	R	1915	RS1/16S121J
C	631	CCSRCH101J50	R	1916	RS1/16S121J
C	632	CCSRCH101J50	R	1917	RS1/16S131J
C	633	CKSRYB103K50			
C	634	CKSRYB472K50	R	1918	RS1/16S151J
C	710	CKSRYB104K16	R	1919	RS1/16S131J
C	711	CKSRYB473K16	R	1920	RS1/16S131J
C	712	CEJA1R0M50	R	1927	RS1/16S472J
C	713	CEJA1R0M50	R	1929	RS1/16S0R0J
C	714	CEJA1R0M50			
C	715	CEJA1R0M50	R	1930	RS1/16S101J
C	750	CKSRYB103K25	R	1931	RS1/16S101J
C	751	CKSQYB104K16	R	1933	RS1/16S201J
			R	1935	RS1/16S393J
C	765	CKSQYB103K50	R	1936	RS1/16S131J
C	799	CKSQYB473K16			
C	910	CCH1326	R	1938	RS1/16S151J
C	911	CKSRYB103K25	R	1939	RS1/16S131J
C	912	CEJA101M16	R	1941	RS1/16S131J
			R	1942	RS1/16S131J
			R	1943	RS1/16S131J
C	913	CEJA101M10			
C	914	CKSRYB473K16	R	1945	RS1/16S121J
C	915	CKSRYB103K25	R	1946	RS1/16S0R0J
C	916	CCH1331	R	1949	RS1/16S151J
C	920	CKSRYB104K16			

C Unit Number : CWM7792
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	1902	IC	SBX8035-H
IC	1903	IC	PD6294A
Q	1905	Transistor	DTC114EU
D	1901	Chip Diode	MA151WK
D	1902	Chip Diode	MA151WA
D	1903	LED	CL170PGCD
D	1917	LED	NSSW440-9159
D	1918	LED	NSSW440-9159
X	1901	Radiator 5.00MHz	CSS1423
S	1901	Push Switch	CSG1112
S	1902	Push Switch	CSG1112
S	1903	Push Switch	CSG1112
S	1904	Push Switch	CSG1112
S	1905	Switch	CSG1107
S	1906	Push Switch	CSG1112
S	1908	Switch	CSG1107
S	1909	Switch	CSG1107
S	1910	Switch	CSG1107
S	1911	Switch	CSG1107
S	1912	Switch	CSG1107

CAPACITORS

C	1902	CKSRYB104K16
C	1903	CSZS100M6R3
C	1905	CKSRYB104K16
C	1906	CKSRYB104K16
C	1907	CKSRYB104K16
C	1923	CKSQYB104K16
C	1930	CKSQYB104K16

B Unit Number : CWM7627
Unit Name : Panel Unit

MISCELLANEOUS

S	1950	Push Switch(EJECT SENSE)	CSG1112
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RESISTORS

R	1951	RS1/16S101J
R	1952	RS1/16S101J
R	1953	RS1/16S101J

====Circuit Symbol and No.==Part Name

Part No.

D Unit Number :
Unit Name : Deck Unit

MISCELLANEOUS

IC	251	IC	HA12229F
IC	351	IC	PA2020A
D	352	Diode	1SS355

RESISTORS

R	271	RS1/16S183J
R	285	RS1/16S0R0J
R	301	RS1/16S163J
R	302	RS1/16S163J
R	303	RS1/16S163J
R	304	RS1/16S163J
R	351	RS1/16S102J
R	352	RS1/16S102J
R	353	RS1/16S102J
R	354	RS1/16S102J
R	355	RS1/16S274J
R	362	RS1/8S301J
R	373	RS1/16S0R0J
R	374	RS1/8S0R0J
R	401	RS1/16S153J
R	402	RS1/16S332J
R	403	RS1/16S911J
R	404	RS1/16S274J

CAPACITORS

C	251	CKSRYB391K50
C	252	CKSRYB391K50
C	253	CKSRYB391K50
C	254	CKSRYB391K50
C	255	CKSRYB103K50
C	256	CKSRYB103K50
C	271	ECH0002
C	272	CKSRYB104K16
C	301	CKSRYB104K16
C	302	CKSRYB104K16
C	351	CKSQYB224K25
C	352	CKSRYB392K50
C	353	CKSRYB103K50
C	354	CKSRYB103K50
C	355	CKSQYB104K50
C	356	CKSRYB103K50
C	401	CKSRYB392K50
C	402	CKSRYB334K10
C	403	CKSRYB223K25
C	404	CKSRYB103K50
C	405	CKSRYB333K16

1μF/50V

====Circuit Symbol and No.==Part Name

Part No.

E Unit Number :
Unit Name : Reel Sense PCB

S	1	Switch(Load)	ESG1007
S	2	Switch(MODE)	ESG1007
EGN	1	Photo-reflector	EGN1004

Miscellaneous Parts List

M	1	Motor Unit(MAIN)	EXA1491
M	2	Motor Unit(SUB)	EXA1580
HD	1	Head Assy	EXA1592

6. ADJUSTMENT

There is no information to be shown in this chapter.

7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 DISASSEMBLY

● Removing the Case (not shown)

1. Remove the Case.

● Removing the Cassette Mechanism Module (Fig.1)

1 Remove the four screws and then remove the Cassette Mechanism Module.

● Removing the Panel Assy (Fig.1)

2 Remove the two screws and then remove the Panel Assy.

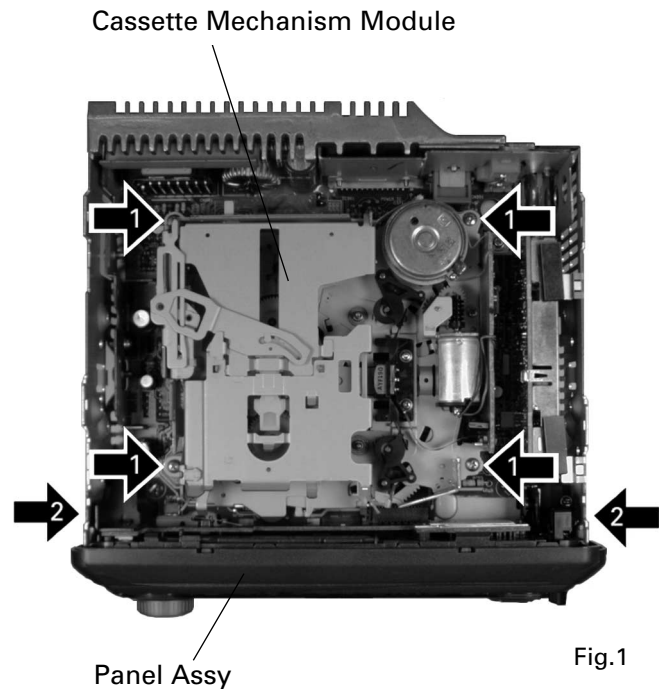


Fig.1

● Removing the Tuner Amp Unit (Fig.2)

- 1** Remove the two screws.
- 2** Straight the tabs at three locations indicated.
- 3** Remove the screw.
- 4** Remove the three screws and then remove the Tuner Amp Unit.

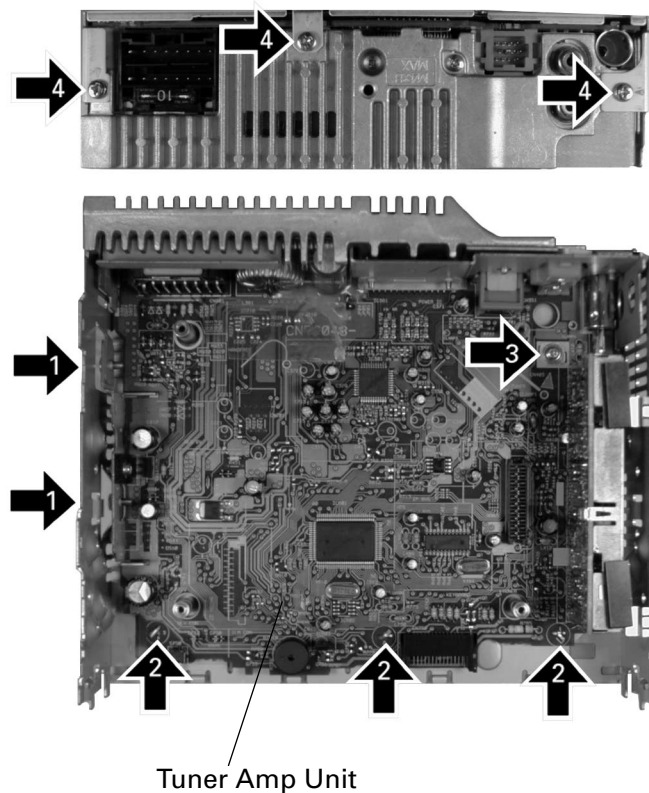
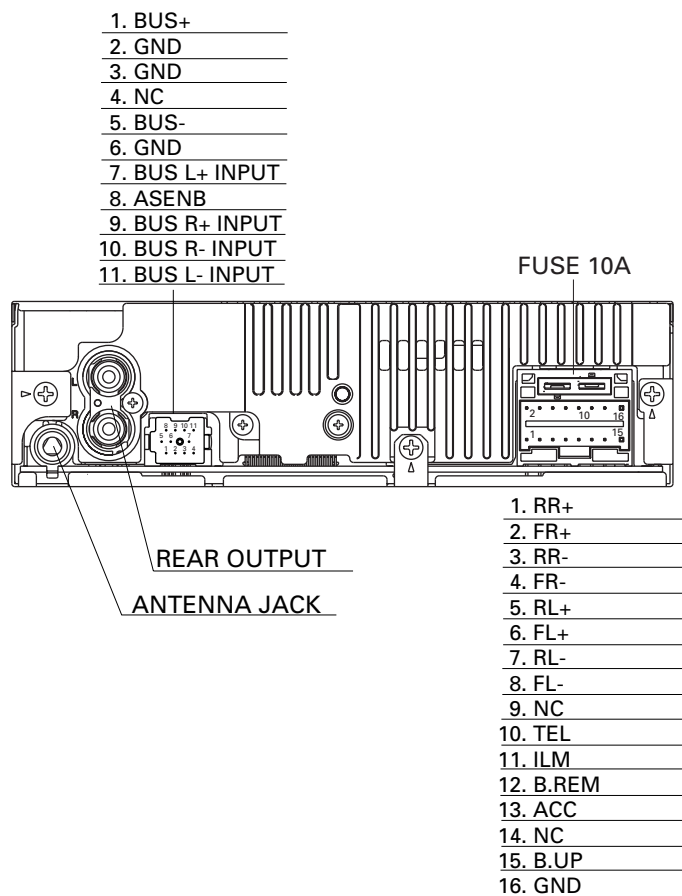


Fig.2

*) Tuner Amp Unit is different partially from this photo.

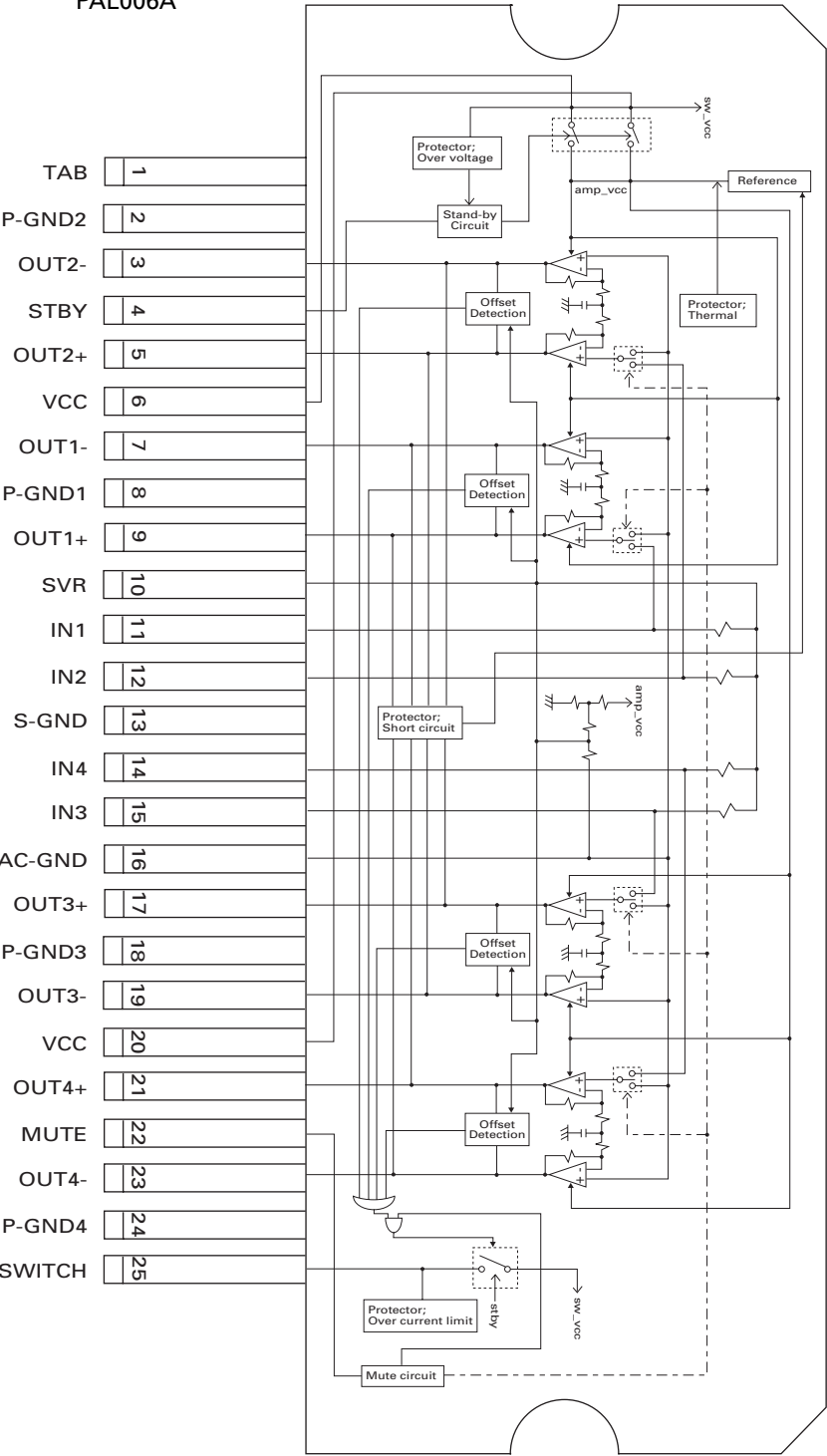
7.1.2 CONNECTOR FUNCTION DESCRIPTION



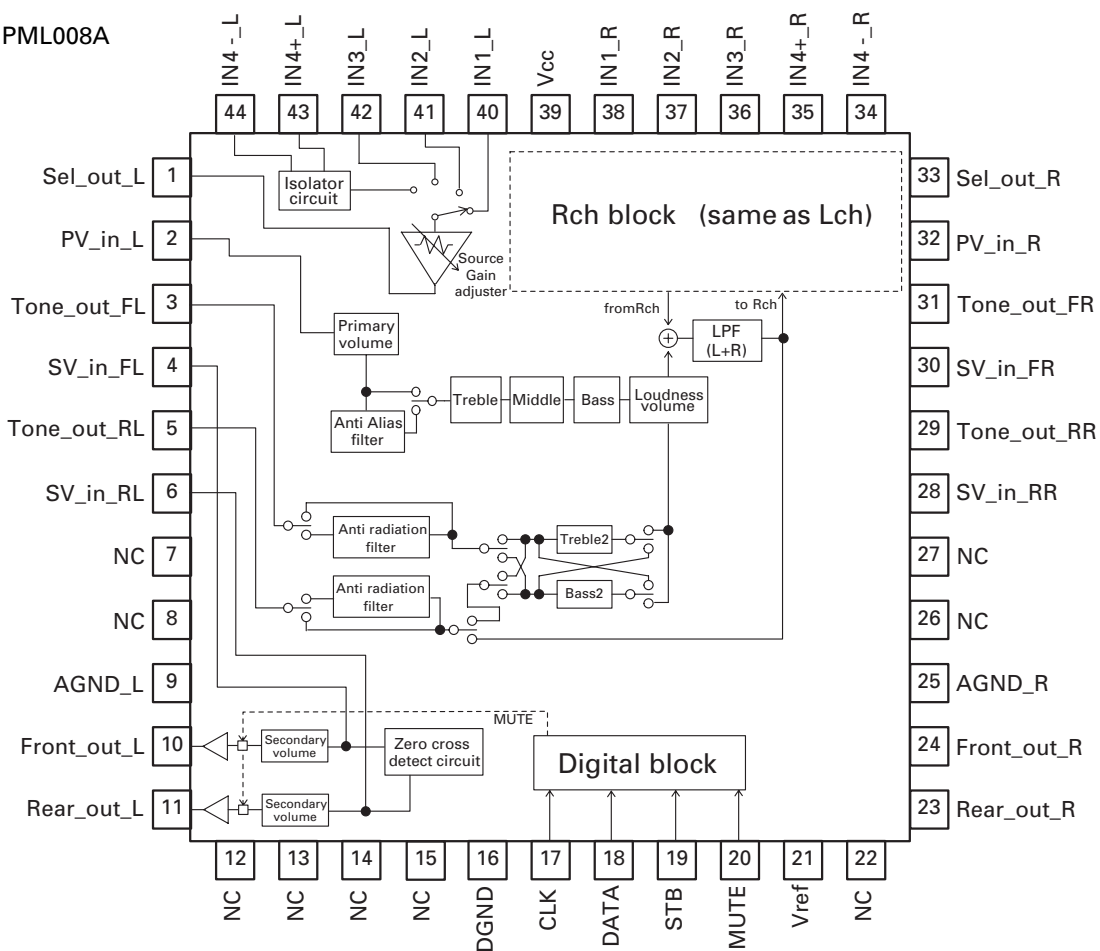
7.2 PARTS

7.2.1 IC

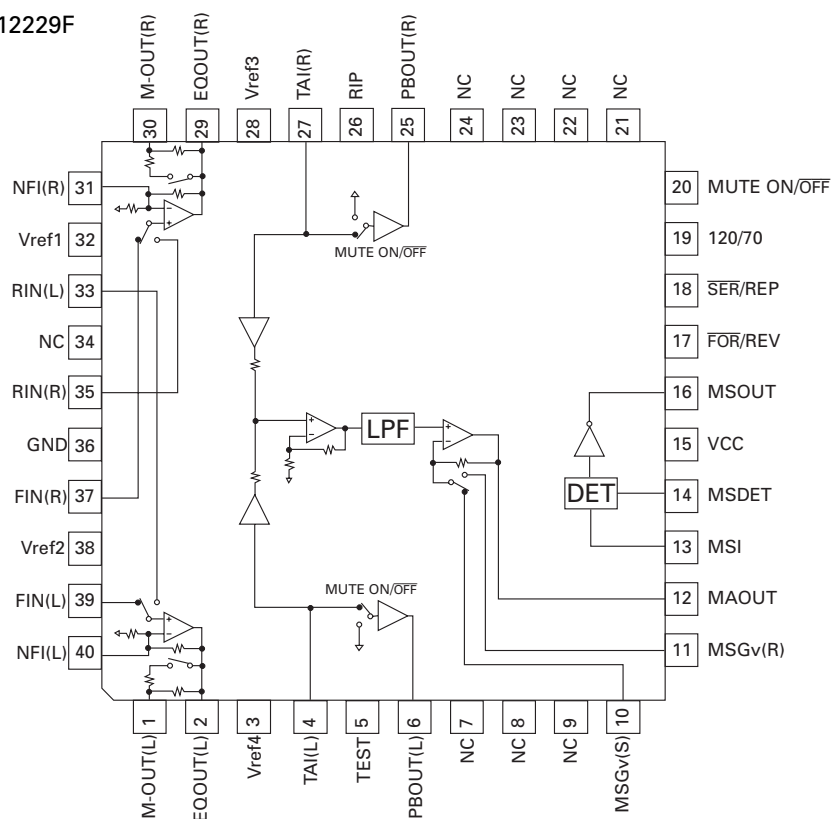
PAL006A



PML008A



HA12229F

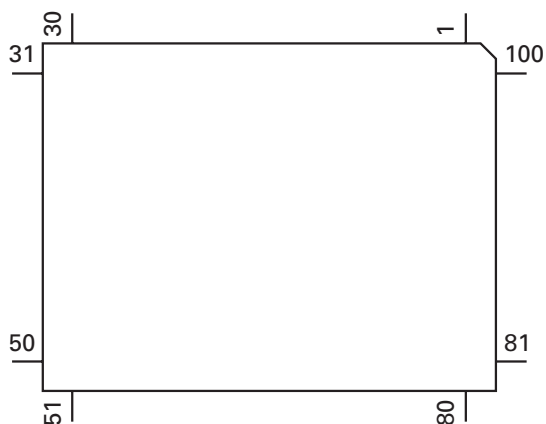


● Pin Functions (PE5207A)

Pin No.	Pin Name	I/O	Function and Operation
1	HFPW	O	Hands free circuit ON output
2	DSSENS	I	Grille detach sense input
3	NC		Not used
4	EJECTIN	I	Eject sense input
5	TESTIN	I	Test program mode input
6	LCDPW	O	LCD back light power supply control output
7	TELIN	I	Telephone mute input
8	ISENS	I	Illumination sense input
9	FLPILM	O	Flap illumination input
10	DALMON		For consumption low-current
11	RESET	I	Reset input
12	XT2		Not used (open)
13	XT1		Clock connection pin
14	VSS(GND)		GND
15	X2		Crystal oscillator connection pin
16	X1		Crystal oscillator connection pin
17	REGOFF		Regulator operation specification signal
18	REGC		Capacitor for regulator connect pin
19	VDD		Power supply
20	ILMPW	O	Illumination power supply control output
21	SYSPW	O	System power control output
22	ADPW	O	A/D converter power supply control output
23	SWVDD	O	Grille:Chip enable output
24	IPPW	O	Power supply control output for IP BUS interface IC
25	ROT1	I	Rotary input 1
26	ROMDATA	O	ROM collection data output
27,28	NC		Not used
29	ROT0	I	Rotary input 0
30	RECIVE	O	During RDS data reception output
31	NC		Not used
32	PCE2	O	EEPROM chip enable output
33	STB	O	Strobe pulse output for electronic volume
34	CLK	O	Clock output for electronic volume
35	DATA	O	Data output for electronic volume
36	NC		Not used
37	MUTE	O	System mute output
38	SD	I	Station detector input
39	ST	I	FM stereo input
40	VSS(GND)		GND
41	VDD		Power supply
42-49	NC		Not used
50	LOCL	O	Local L output
51	LOCH	O	Local H output
52-54	NC		Not used
55	STBY	O	CASSETTE:Drive IC control output
56	CM	O	CASSETTE:Capstan control output
57	SC1	O	CASSETTE:Sub motor control output
58	SC2	O	CASSETTE:Sub motor control output
59	NES	I	CASSETTE:Normal reel sense input
60	RES	I	CASSETTE:Reverse reel sense input
61	POS	I	CASSETTE:Position sense input

Pin No.	Pin Name	I/O	Function and Operation
62	PCL		Clock adjustment
63,64	NC		Not used
65	RIMUTE	O	CASSETTE:RI mute output
66	MSIN	I	CASSETTE:MS sense input
67	PLAY	O	CASSETTE:Gain select output
68	DIRO	O	CASSETTE:Dolby N/R select output
69	LOADSW	I	CASSETTE>Loading switch sense input
70	NC		Not used
71	ASENBO	O	IP-BUS:Slave power supply control output
72	MUTE	O	E.VOL:Mute control output
73	TEST(GND)	I	GND
74	SL	I	TUNER:Signal level input
75	NC		Not used
76	MODELIN	I	Model select input
77	CSENS	I	Flap close sense input
78-81	NC		Not used
82	AVDD		A/D converter power supply terminal
83	AVREF		A/D converter reference voltage terminal
84	AVSS		GND
85	RX	I	IP-BUS:data input
86	TX	O	IP-BUS:data output
87	NMI		GND
88	LDET	I	PLL lock sense input
89-91	NC		Not used
92	ASENS	I	ACC power sense input
93	BSSENS	I	Back up power sense input
94	TUNPDI	I	PLL IC data input
95	KYDT	I	Grille data input
96	DPDT	O	Grille data output
97	PCK	O	PLL IC clock output
98	PDO	O	PLL IC data output
99	PCE	O	PLL IC chip enable output
100	PEE	O	Beep tone output

*PE5207A



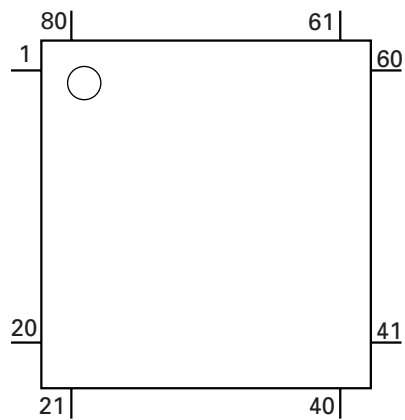
IC's marked by* are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.

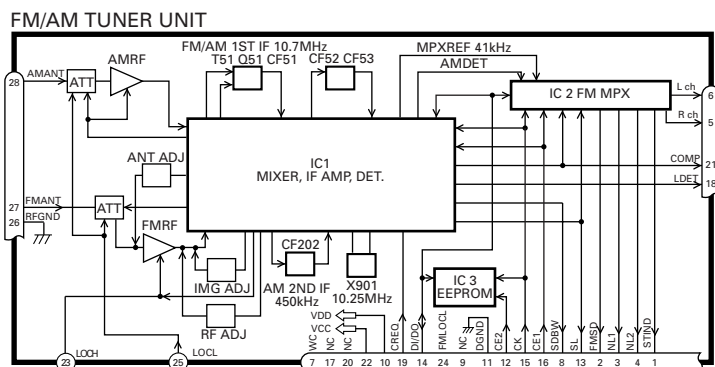
● Pin Functions (PD6294A)

Pin No.	Pin Name	I/O	Function and Operation
1	VSS		GND
2	X1		Crystal oscillator connection pin
3	X0		Crystal oscillator connection pin
4	NC		Not used
5,6	MOD1,0	I	Connect to GND
7	DIMMER	O	Dimmer select output
8	KYDT	O	Key data output
9	DPDT	I	Display data input
10	REMIN	I	Remote control pulse input
11	GRN		Dual Illumination (Green)
12	AMB		Dual Illumination (Amber)
13-16	KD4-KD1	I	Key data input
17-22	KST6-KST1	O	Key strobe output
23	VDD		VDD
24-73	SEG49-0	O	LCD segment output
74-77	COM3-0	O	LCD common output
78	VLCD	I	LCD voltage input
79,80	V2,V1		Power supply terminal

*PD6294A



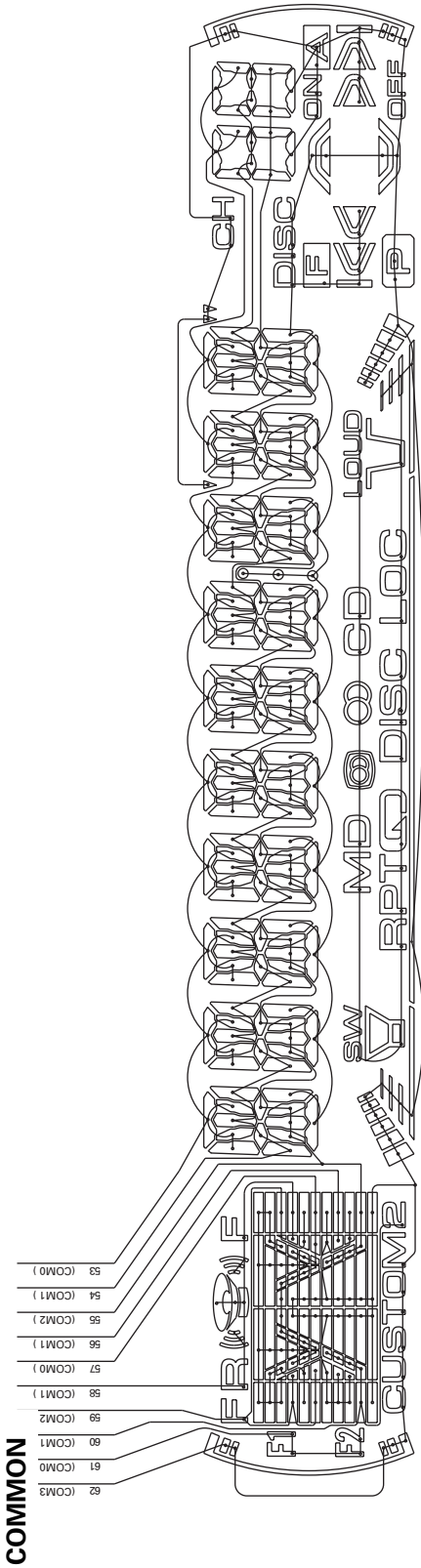
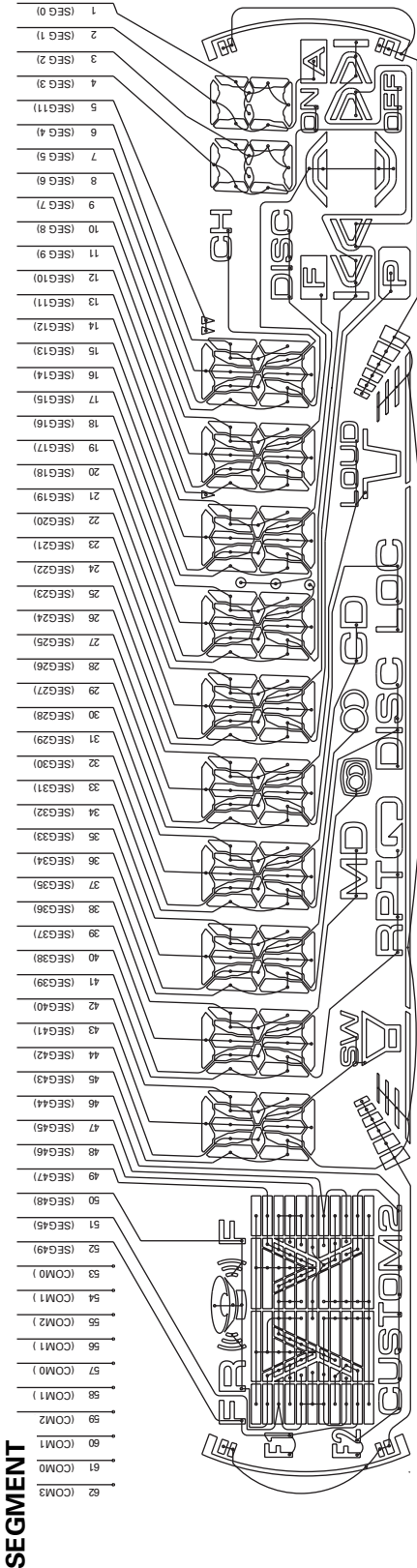
● FM/AM Tuner Unit



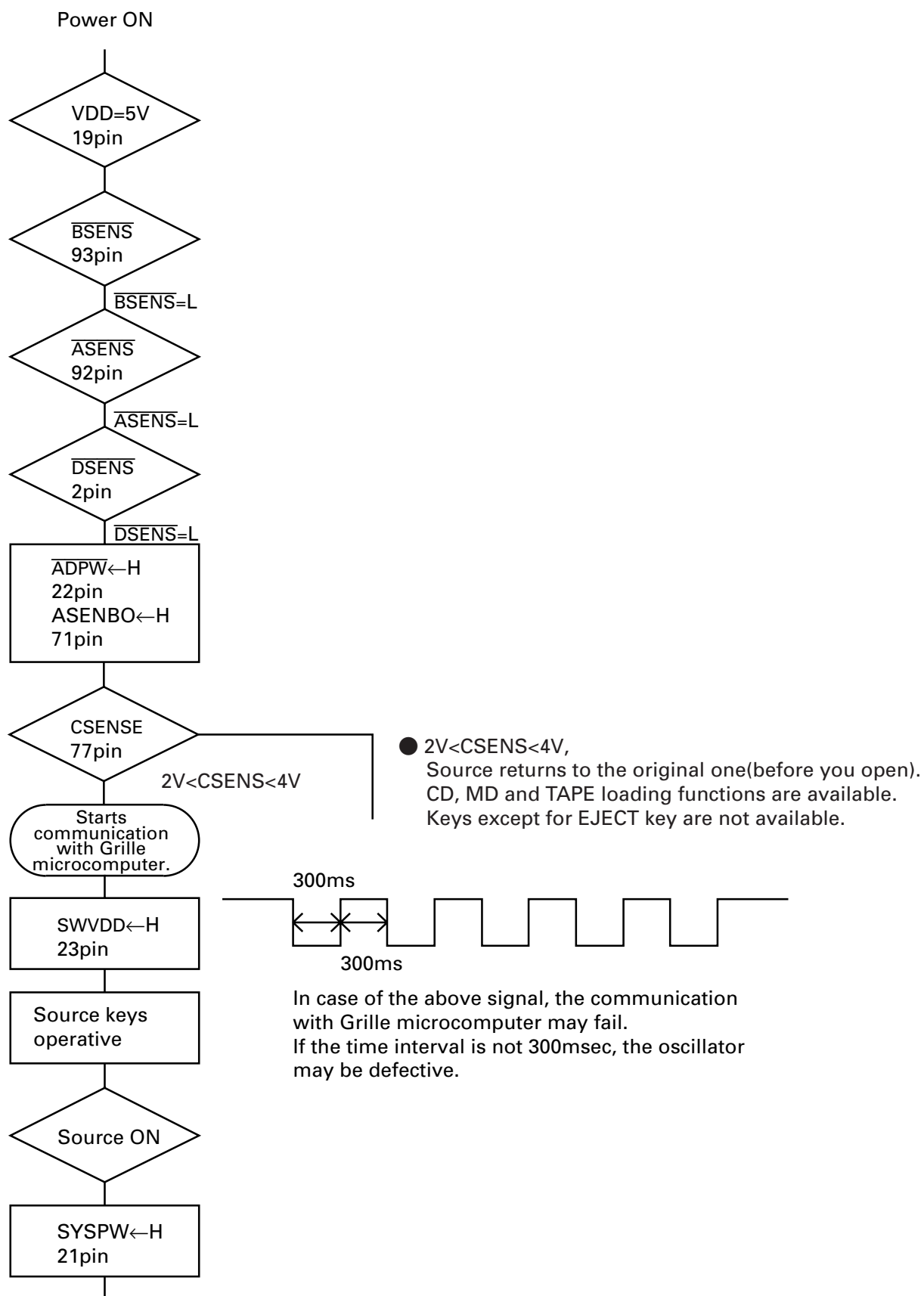
No.	Symbol	I/O	Explain	
1	STIND	O	stereo indicator	"Low" when the FM stereo signals are received. To be pulled up to the "VDD" at 47kΩ.
2	FMSD	O	FM station detector	"High" when signals are received. To be pulled up to the "VDD" at 47kΩ Meanwhile, 10kΩ should be used when taking diver FIX trigger from here and "High: 0.9VDD or more" and "Low: 250mV or less". (Should satisfy the diver IC specifications)
3	NL1	O	noise level-1	"High" when noise is received. Output for the RDS. GND at 47kΩ //1,800pF.
4	NL2	O	noise level-2	"High" when noise is received. Output for the RDS. GND at 36kΩ //330pF.
5	Rch	O	R channel output	FM stereo "R-ch" signal output or AM audio output. Add the specified di-emphasis constant.
6	Lch	O	L channel output	FM stereo "L-ch" signal output or AM audio output. Add the specified di-emphasis constant.
7	WC		write control	EEPROM write control. Writing permissible at "Low". Normally open.
8	SDBW	O	SD bandwidth	SD bandwidth signal output. For detection of detuning data for the RDS.
9	NC			Not used
10	VDD		power supply	Power supply pin for the digital section. D.C. 5V +/- 0.25V. Be careful about overlapping noise in the logic section.
11	DGND		digital ground	Grounding for the digital section.
12	CE2	I	chip enable-2	EEPROM chip enable. Active a "Low" To be pulled up to the "VDD" at 47kΩ
13	SL	I/O	signal level	Received FM/AM signal level (strength) output. Connect the specified load resistor and capacitor (10k Ω + 39k Ω //4,700pF)
14	DI/DO	I/O	data input/ data output	Data input/Data output To be pulled up to the "VDD" at 47kΩ
15	CK	I	clock	Clock input To be pulled up to the "VDD" at 47kΩ
16	CE1	I	chip enable-1	AF-RF chip enable. Active at "High" To be grounded at 47kΩ
17	NC			Not used
18	LDET	O	lock detector	Active at "Low". To be pulled up to the "VDD" at 47kΩ
19	CREQ	I	current request	Active at "Low". To be grounded at 47kΩ
20	NC			Not used
21	COMP	O	composite signal	FM composite signal output. r out < 100Ω
22	VCC		power supply	Analog section power supply pin.D.C.8.4V +/- 0.3V
23	LOCH	I	local high	FM local high pin. When seeking local high, apply 5V together with "LOCL".
24	FMLOCL	I	FM local low	FM local low pin. When seeking local low, apply 5V to the base of the NPN transistor with which the specified resistor is being connected to the emitter. Keep it open in case of ordinary marketed models.
25	LOCL	I	local low	FM/AM local low pin. When seeking local low, apply 5V to the base of the NPN transistor. Since this pin is exclusive for AM when the FMLOCL is in use, do not drive it under FM.
26	RFGND		RF ground	Grounding for the antenna section.
27	FMANT	I	FM antenna input	FM antenna input. 75Ω. Serge absorber (DSP-201M-S00B) is necessary.
28	AMANT	I	AM antenna input	AM antenna input. High impedance. Connect to the antenna through an L (LAU type) of 4.7μH.To cope with the power transmission line hums, insert a series circuit consisting of an L (a coil of about 100mH) + R (a resistor of 470 Ω to 2.2kΩ) between the GND.

7.2.2 DISPLAY

● CAW1628



7.3 OPERATIONAL FLOW CHART



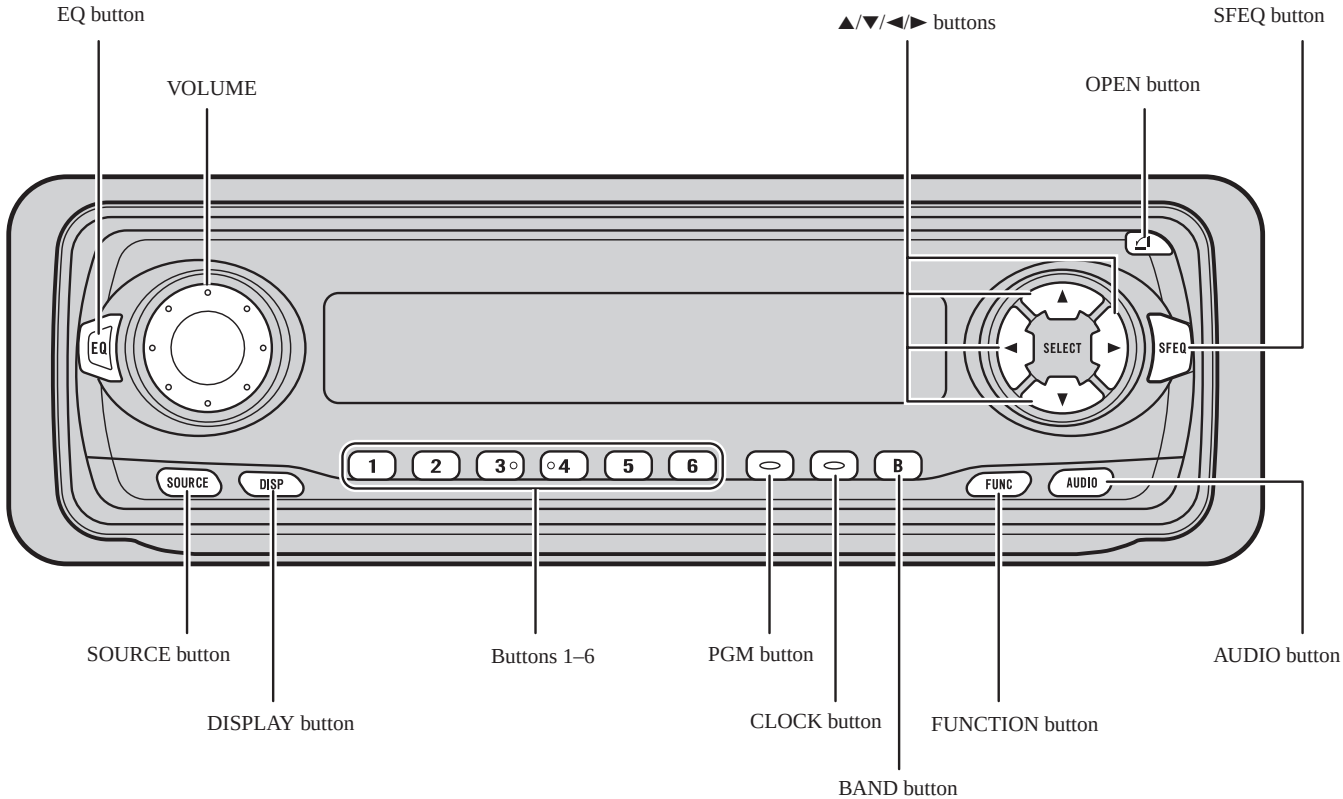
Completes power-on operation.
(After that, proceed to each source operation)

8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

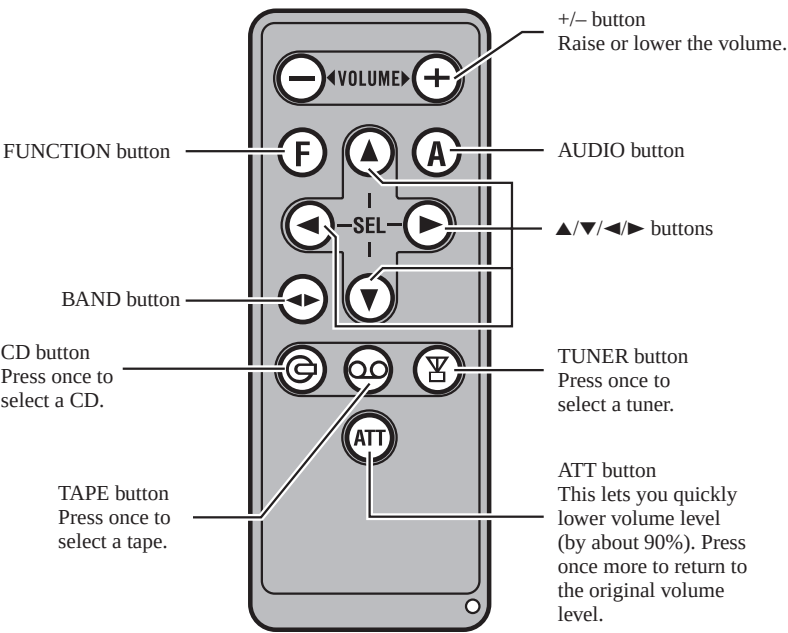
Key Finder

Head Unit



Remote Controller

A remote controller that enables remote operation of the head unit is supplied. Operation is the same as when using buttons on the head unit.



Basic Operation

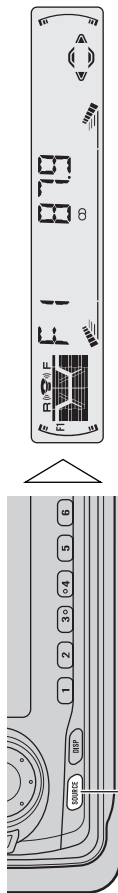
To Listen to Music

The following explains the initial operations required before you can listen to music.

Note:

- Loading a cassette in this product.

1. Select the desired source. (e.g. Tuner)



Each press changes the Source ...

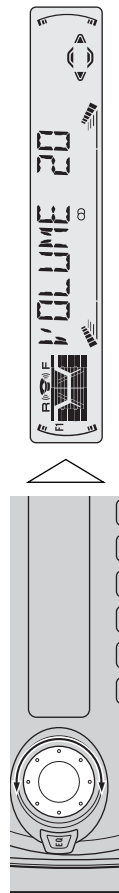
■ Head Unit

Each press of the SOURCE button selects the desired source in the following order:
CD player (one disc only) → TV → Tuner → Cassette Player → Multi-CD player
→ External Unit → AUX

Note:

- External Unit refers to a Pioneer product (such as one available in the future) that, although incompatible as a source, enables control of basic functions by this product. Only one External Unit can be controlled by this product.
- In the following cases, the sound source will not change:
 - * When a product corresponding to each source is not connected to this product.
 - * When no tape is set in this product.
 - * When no magazine is set in the Multi-CD player.
 - * When the AUX (external input) is set to OFF.
 - * When no disc is set in the CD player (one disc only).
- When this product's blue/white lead is connected to the car's Auto-antenna relay control terminal, the car's Auto-antenna extends when this product's source is switched ON. To retract the antenna, switch the source OFF.

2. Raise or lower the volume.

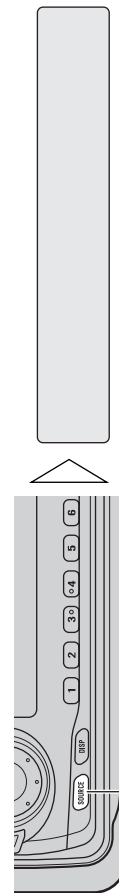


Rolling the VOLUME changes the volume level.

Note:

- Roll clockwise to raise the volume level.
- Roll counterclockwise to lower the volume level.

3. Turn the source OFF.



Hold for 1 second

Basic Operation of Tuner

Manual and Seek Tuning

- You can select the tuning method by changing the length of time you press the ◀/▶ button.

Manual Tuning (step by step)	0.5 seconds or less
Seek Tuning	0.5 seconds or more

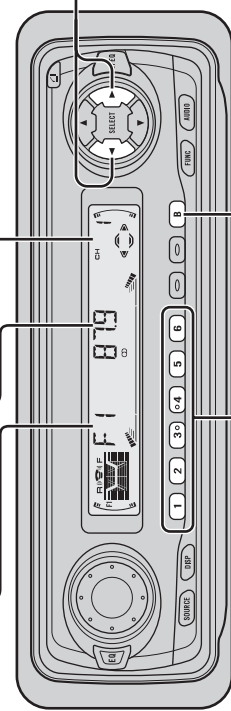
Note:

- If you continue pressing the button for longer than 0.5 seconds, you can skip broadcasting stations. Seek Tuning starts as soon as you release the button.
- Stereo indicator "◐" lights when a stereo station is selected.

Frequency Indicator

Band Indicator

Preset Number Indicator



Preset Tuning

- You can memorize broadcast stations in buttons 1 through 6 for easy, one-touch station recall.

Preset station recall	2 seconds or less
Broadcast station preset memory	2 seconds or more

Note:

- Up to 18 FM stations (6 in F1 (FM1), F2 (FM2) and F3 (FM3)) and 6 AM stations can be stored in memory.
- You can also use the ▲ or ▼ buttons to recall broadcast stations memorized in buttons 1 through 6.

Basic Operation of Cassette Player

Note:

- Be sure to close the front panel after loading or ejecting a cassette.

Open

Note:

- Use to open the front panel when loading or ejecting a cassette.
(The illustration on the right shows the front panel open.)

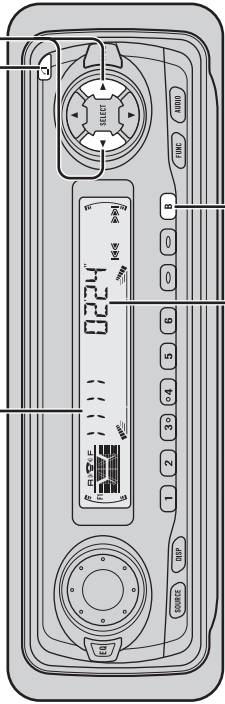
Fast Forward/Rewind and Music Search

- Each press of the **▶** button selects **Fast Forward or Forward-Music Search**.
FF (Fast Forward) → F-MS (Forward-Music Search) → Normal Playback
- Each press of the **◀** button selects **Rewind or Rewind-Music Search**.
REW (Rewind) → R-MS (Rewind-Music Search) → Normal Playback

Note:

- Fast Forward/Rewind and Music Search can be canceled by pressing the BAND button.

Direction Indicator



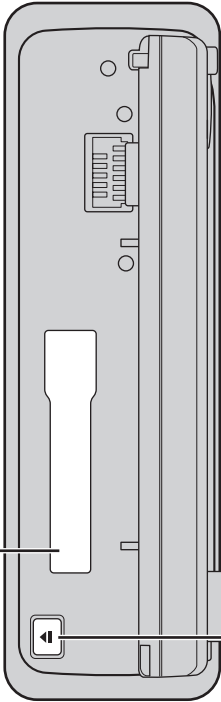
Play Time Indicator

Note:

- The continuous playback time count starts at 00'00" at the following times.
 - * When a tape is inserted.
 - * When the tape direction is changed.
 - * When you rewind the tape side currently playing back to the beginning.
- The continuous playback time count is halted when fast-forwarding/rewinding and while the Music Search function is operating.

Cassette Loading Slot

- Note:**
- Do not insert anything other than a cassette into the Cassette Loading Slot.



Note:

- The Tape function can be turned ON/OFF with the cassette tape remaining in this product.

Basic Operation

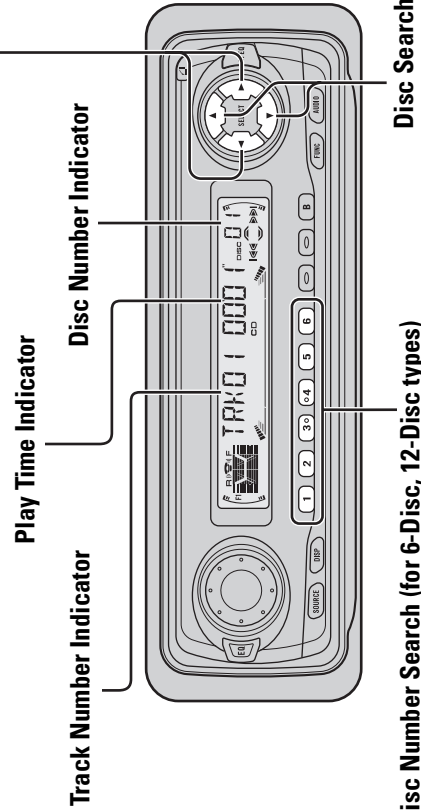
Basic Operation of Multi-CD Player

This product can control a Multi-CD player (sold separately).

Track Search and Fast Forward/Reverse

- You can select between Track Search or Fast Forward/Reverse by pressing the ◀/▶ button for a different length of time.

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing



Disc Number Search (for 6-Disc, 12-Disc types)

- You can select discs directly with the 1 to 6 buttons. Just press the number corresponding to the disc you want to listen to.

Note:

- When a 12-Disc Multi-CD Player is connected and you want to select disc 7 to 12, press the 1 to 6 buttons for 2 seconds.

Note:

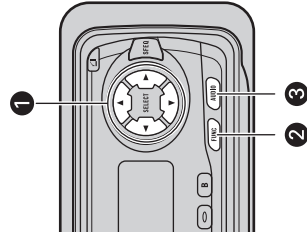
- The Multi-CD player may perform a preparatory operation, such as verifying the presence of a disc or reading disc information, when the power is turned ON or a new disc is selected for playback. "READY" is displayed.
- If the Multi-CD player cannot operate properly, an error message such as "ERROR-14" is displayed. Refer to the Multi-CD player owner's manual.
- If there are no discs in the Multi-CD player magazine, "NO DISC" is displayed.

Corresponding Display Indications and Buttons

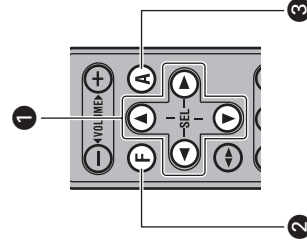
This product's display features Key Guidance Indicators. These light to indicate which of the ▲/▼/◀/▶, FUNCTION and AUDIO buttons you can use. When you're in the Function Menu, Detailed Setting Menu, Initial Setting Menu or Audio Menu, they also make it easy to see which ▲/▼/◀/▶ buttons you can use to switch functions ON/OFF, switch repeat selections and perform other operations.

Indicator and corresponding buttons are shown below.

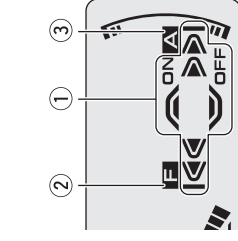
■ Head Unit



■ Remote Controller



■ Display



When ① is lit in the display, perform appropriate operations with the ① buttons.

When ② is lit in the display, it indicates that you are in the Function Menu, Detailed Setting Menu or Initial Setting Menu. You can switch between each of these menus and between different modes in the menus using button ② on the head unit or remote controller.

When ③ is lit in the display, it indicates you are in the Audio Menu. You can switch between modes in the Audio Menu using button ③ on the head unit or remote controller.

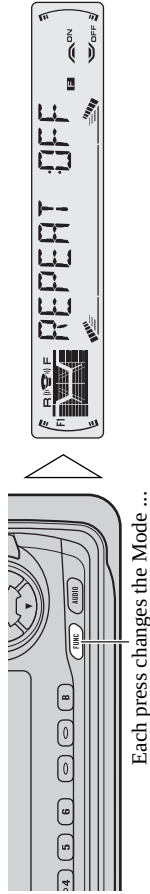
Entering the Function Menu

The Function Menu lets you operate simple functions for each source.

Note:

- After entering the Function Menu, if you do not perform an operation within about 30 seconds, the Function Menu is automatically canceled.

1. Select the desired mode in the Function Menu.



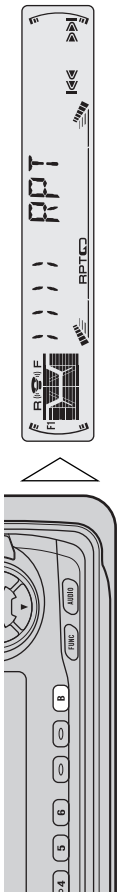
Continued overleaf.

2. Operate a mode. (e.g. Repeat Play)

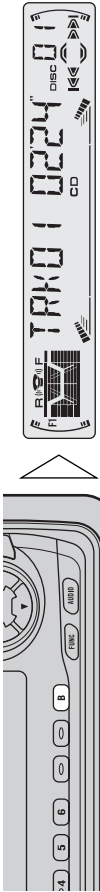


The button used and the operation it performs are indicated by the key guidance indicator. Press the button to switch the key guidance indicator ON, and the button to switch it OFF.

3. Cancel the Function Menu.



4. Cancel the Detailed Setting Menu.



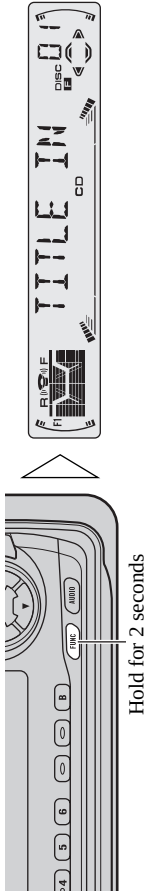
Note:

- You can cancel the Detailed Setting Menu by pressing the FUNCTION button again for 2 seconds.

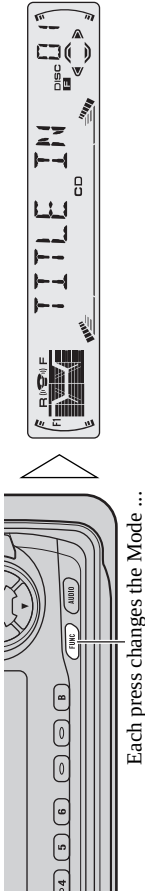
Entering the Detailed Setting Menu

In the Detailed Setting Menu, you can operate convenient, complex functions for each source.

1. Enter the Detailed Setting Menu.

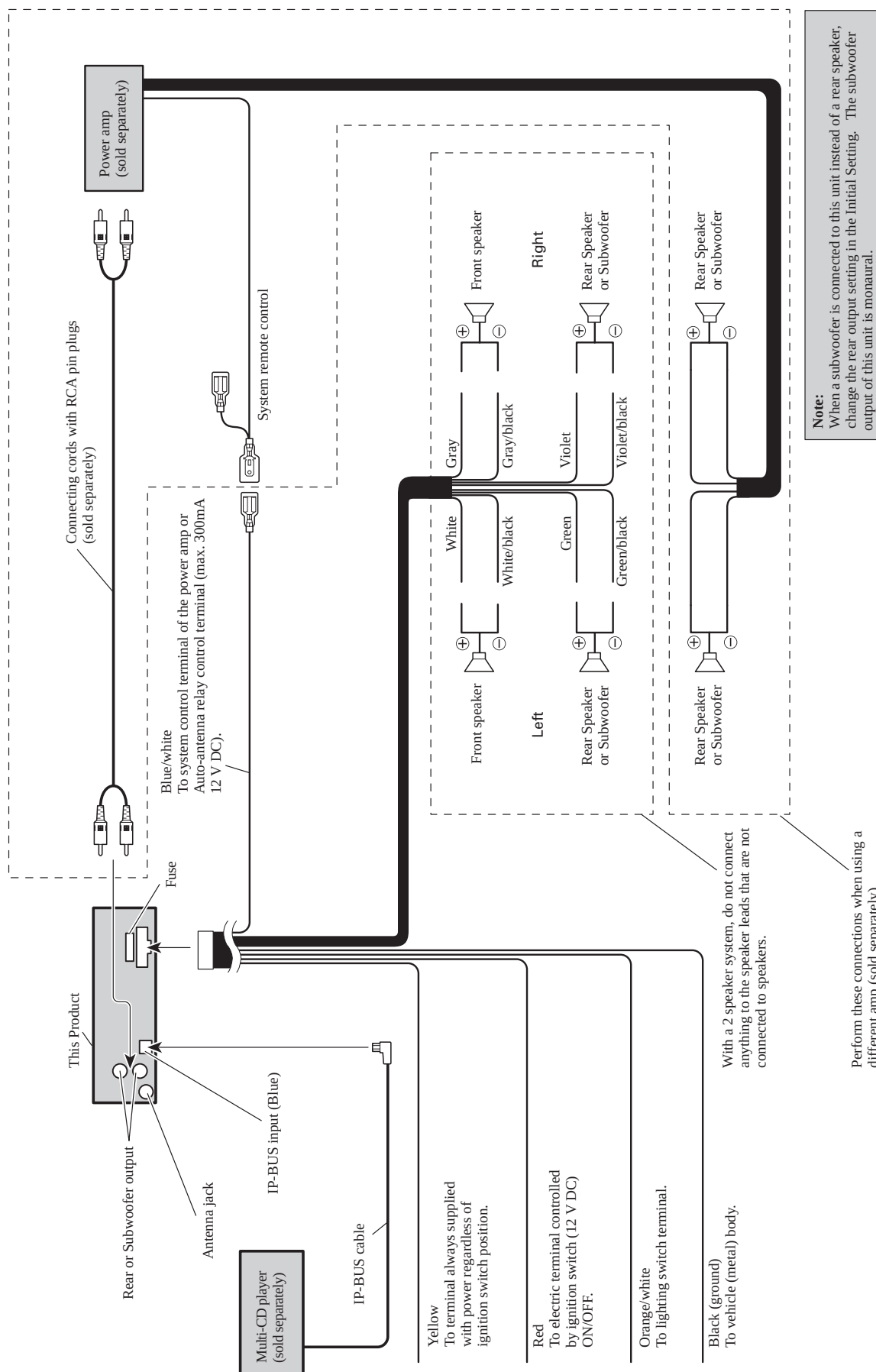


2. Select the desired mode.



3. Operate a mode.

● CONNECTION DIAGRAM



Power source	14.4 V DC (10.8 – 15.1 V allowable)
Grounding system	Negative type
Max. current consumption	10.0 A
Dimensions	
(DIN) (chassis)	178 (W) × 50 (H) × 157 (D) mm [7 (W) × 2 (H) × 6-1/8 (D) in]
(nose)	188 (W) × 58 (H) × 19 (D) mm [7-3/8 (W) × 2-1/4 (H) × 3/4 (D) in]
(D) (chassis)	178 (W) × 50 (H) × 162 (D) mm [7 (W) × 2 (H) × 6-3/8 (D) in]
(nose)	170 (W) × 46 (H) × 14 (D) mm [6-3/4 (W) × 1-3/4 (H) × 1/2 (D) in]
Weight	1.4 kg (3.1 lbs)
Backup current	5mA

Continuous power output is 22 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.

Maximum power output 50 W $\times$ 4
50 W $\times$ 2 ch/4 Ω + 70 W $\times$ 1 ch/2 Ω (for Subwoofer)

Load impedance
..... 4 Ω (4 – 8 Ω [2 Ω for 1 ch] allowable)

Preout maximum output level/
output impedance 2.2 V/1 k Ω

Equalizer (3-Band Parametric Equalizer)

(Low) Frequency: 40/80/100/160 Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: $\pm$ 12 dB

(Mid) Frequency: 200/500/1k/2k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: $\pm$ 12 dB

(High) Frequency: 3.15k/8k/10k/12.5k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: $\pm$ 12 dB

Loudness contour

(Low) +3.5 dB (100 Hz), +3 dB (10 kHz)
(Mid) +10 dB (100 Hz), +6.5 dB (10 kHz)
(High) +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)

Tone controls

(Bass) Frequency: 40/63/100/160 Hz
Level: $\pm$ 12 dB

(Treble) Frequency: 2.5k/4k/6.3k/10k Hz
Level: $\pm$ 12 dB

Subwoofer output

Frequency 50/80/125 Hz
Slope –12 dB/oct
Gain $\pm$ 12 dB

Tape Compact cassette tape (C-30 – C-90)
Tape speed 4.76 cm/sec.(+0.14cm/sec., -0.05cm/sec.)
Fast forward/rewinding time ... Approx. 100 sec. for C-60
Wow & flutter 0.09% (WRMS)
Frequency response 30 – 16,000 Hz (±3 dB)
Stereo separation 45 dB
Signal-to-noise ratio 61 dB (IHF-A network)

Frequency range	87.9 – 107.9 MHz
Usable sensitivity	9 dBf
	(0.8 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity	15 dBf (1.5 µV/75 Ω, mono)
Signal-to-noise ratio	70 dB (IHF-A network)
Distortion	0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response	30 – 15,000 Hz (±3 dB)
Stereo separation	40 dB (at 65 dBf, 1 kHz)
Selectivity	70 dB (2ACA)
Three-signal intermodulation (desired signal level)	30 dBf
	(two undesired signal level: 100 dBf)

Frequency range 530 – 1,710 kHz (10 kHz)
Usable sensitivity 18 μ V (S/N: 20 dB)
Selectivity 50 dB ($\pm$ 10 kHz)

- Specifications and the design are subject to possible modification without notice due to improvements.